REPUBLICA DE CABO VERDE

AGÊNCIA DE AVIAÇÃO CIVIL

Instruction Nº 07/DSV/2015

SUBJECT: EXTENDED DIVERSION TIME OPERATIONS (EDTO)

DATE: 24/07/2015

1. PURPOSE

This Instruction provides guidance to certificate holders applying for approval to conduct EDTO in accordance with the requirements of CV-CAR 8. This instruction also provides guidance to certificate holders currently conducting such operations in resolving operational and airworthiness issues that arise.

2. APPLICABILITY

This instruction applies to transport category aeroplanes with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than 60 minutes and/or than the threshold time established by the AAC, operated by an air operator in an international air transport service.

3. REFERENCES

- CV-CAR 8.F.250, 8.F.255 and CV-CAR 8.F.260
- **ICAO Annex 6, A**ttachment D

4. DEFINITIONS AND ABBREVIATIONS

4.1.1 For the purpose of this instruction the following definition shall apply:

(1) **Alternate aerodrome.** An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

(a) **Take-off alternate.** An alternate aerodrome at which an aircraft can would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

(b) **En-route alternate**. An alternate aerodrome at which an aircraft would be able to land after experiencing an abnormal or emergency condition in the event that a diversion becomes necessary while en route.

(c) **Destination alternate.** An alternate aerodrome to at which an aircraft may proceed would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

Note.— The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.

(2) **Approved all engine operating (AEO) speed** – The approved AEO cruise speed for the aeroplane must be a speed, within the certified limits of the aeroplane, selected by the operator and approved by AAC. The AEO speed may be different from the speed used for the maximum diversion time and threshold time.

(3) **Area of operation** – The area within which EDTO operations are approved where the EDTO diversion time, at any point along the proposed route of the flight, to an EDTO en-route alternate aerodrome, is within the operators approved EDTO maximum diversion time, in ISA conditions, still air, at the approved OEI or AEO cruise speed, as applicable.

(4) **Approved one engine inoperative (OEI) speed** – The approved OEI cruise speed for the intended area of operation must be a speed, within the certificated limits of the aeroplane, selected by the operator and approved by AAC. The speed should be the same speed used to determine the fuel reserves for one engine inoperative flight, but may be different from the speed used for the maximum diversion and threshold time.

(5) **EDTO alternate.** An en-route alternate aerodrome that is designated in a dispatch or flight release for use in the event of a diversion during an EDTO flight, and which meets the applicable dispatch minima (weather and field conditions). This definition applies to flight planning and does not in any way limit the authority of the pilot-in-command during flight.

(6) **EDTO - configuration, maintenance and procedures (CMP) document.** The document approved by the Primary Certifying Authority and which contains the particular aeroplane configuration minimum requirements, including any special inspection, hardware life limits, master minimum equipment list (MMEL) constraints and maintenance practices found necessary.

(7) **EDTO - configuration, maintenance and procedures (CMP) requirements.** The particular aeroplane configuration minimum requirements including any special inspection, hardware life limits, master minimum equipment list (MMEL) constraints and maintenance practices found necessary to establish the suitability of an airframe-engine combination for extended diversion time operation.

(8) **EDTO critical fuel**. The fuel quantity necessary to fly to an en-route alternate aerodrome considering, at the most critical point on the route, the most limiting system failure.

(9) **EDTO significant system.** An aeroplane system whose failure or degradation could adversely affect the safety particular to an EDTO flight, or whose continued functioning is specifically important to the safe flight and landing of an aeroplane during an EDTO diversion.

(10) **Extended diversion time operations (EDTO).** Any operation by an aeroplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the State of the Operator.

(11) **Isolated aerodrome**. A destination aerodrome for which there is no destination alternate aerodrome suitable for a given aeroplane type.

(12) **Mandatory Continuing Airworthiness Information (MCAI).** The mandatory requirements for the modification, replacement of parts, or inspection of aircraft and amendment of operating limitations and procedures for the safe operation of the aircraft. Among such information is that issued by Contracting States in the form of airworthiness directives.

(13) **Maximum diversion time.** Maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome.

(14) **Operator's approved diversion time** – is the maximum time authorised by AAC that the operator can operate an aeroplane type at the approved OEI cruise speed (under standard conditions in still air) from an adequate aerodrome for the area of operation.

(15) **QFE** – is the barometric altimeter setting that causes an altimeter to read zero when at the reference datum of a particular airfield (in practice, the reference datum is either an airfield center or a runway threshold). In ISA temperature conditions the altimeter will read height above the airfield/runway threshold in the vicinity of the airfield.

(16) **QNH** – is the barometric altimeter setting that causes an altimeter to read airfield elevation when on the airfield. In ISA temperature conditions the altimeter will read altitude above mean sea level in the vicinity of the airfield

(17) **Point of no return.** The last possible geographic point at which an aeroplane can proceed to the destination aerodrome as well as to an available en route alternate aerodrome for a given flight.

(18) **Threshold time.** (ICAO) The range, expressed in time, established by the State of the Operator to an en-route alternate aerodrome, whereby any time beyond requires an EDTO approval from the State of the Operator.

4.1.2 The following acronyms and abbreviations are used in this circular:

(1) AAC – Agência de Aviação Civil

(2) AD - Airworthiness Directive

(3) AFM - Aircraft Flight Manual

(4) AOC - Air Operators Certificate

(5) APU - Auxiliary Power Unit

(6) AEO – All engine Operating

(7) ATC - Air Traffic Control

(8) CMP - Configuration Maintenance and Procedures

(9) CV-CAR – Cabo Verde Civil Aviation Regulations

(10) DH - Decision Height

(11) EASA - European Aviation Safety Agency

(12) ETOPS - Extended Twin-Engine Aeroplane Operations

(13) FAA - Federal Aviation Administration (of the USA)

(14) FAR - Federal Aviation Regulations (of the USA)

(15) HF - High Frequency (3000 to 30 000 KHZ)

(16) ICAO - International Civil Aviation Organization

(17) IFSD - In-flight Shut Down

(18) INTER Intermittent

(19) ISA - International Standard Atmosphere

(20) JAR - Joint Aviation Requirements (of the Joint Aviation Authorities Europe)

(21) MCM - Maintenance Control Manual

(22) MDA - Minimum Descent Altitude

(23) MEL - Minimum Equipment List

(24) MMEL - Master Minimum Equipment List

(25) NAA - National Airworthiness Authority

(26) NOTAM - Notice to Airmen

(27) OEI – One Engine Inoperative

(28) PDSC - Pre-departure Service Check

(29) PIC - Pilot-in-command

(30) PROB – Probability

(31) RAT - Ram Air Turbine

(32) RFFS - Rescue and fire fighting services

(33) SATCOM - Satellite Communication

(34) STC - Supplemental Type Certificate

(35) TCDS - Type Certificate Data Sheet

(36) TEMPO - Temporary

5. BACKGROUND

5.1 Extended diversion time operations

5.1.1 The development of the modern turbofan engine has made it possible to extend the range of multi-engine aeroplanes to allow some of them to fly great distances.

5.1.2 The problems that must be taken into account when planning flights over such distances include the availability of suitable aerodromes where a landing can be made in the event of an emergency. Because of the additional problems associated with the loss of a power unit or certain major systems, it is necessary, as a first step to set a limit on the distance a multi-engine aeroplane may be from an adequate aerodrome without special requirements being imposed.

5.1.3 Any operation that is planned to involve flight by a multi-engine public transport aeroplane where the diversion time to an en-route alternate aerodrome is greater than the threshold time will be considered as Extended Diversion Time Operations (EDTO).

5.1.4 ETOPS is considered as equivalent to EDTO for twin-turbine engine aeroplanes. Operators with ETOPS Approval DO NOT require to apply for EDTO Approval for the same aeroplane airframe/engine combinations and on the same routes and to the same maximum diversion time as was authorised for ETOPS. The previous edition of CV-CAR 8, which details the corresponding provisions for ETOPS, is considered as an acceptable mean of compliance to the requirements for EDTO for twin-engine aeroplanes.

5.1.5 For all twin-turbine engine aeroplanes which are flying for the purpose of public transport, and requires to fly more than a threshold time of 60 minutes (calculated at OEI cruise speed in still air and International Standard Atmosphere (ISA) conditions) from an en-route alternate aerodrome; or all aeroplanes with three or more turbine engines which are flying for the purpose of public transport and require to fly more than a threshold time of 180 minutes flight time (calculated at an All Engines Operative (AEO) cruise speed in still air and ISA conditions) from an en-route alternate aerodrome; the corresponding operations must be so approved in accordance with the requirements stipulated in this TC.

5.1.6 ETOPS type design approvals and operational approvals obtained before the issue of this revision remain valid. Extension of existing ETOPS type design approvals or operational approvals beyond 180 min should be issued in accordance with this revision.

5.1.7 The approval for conducting EDTO applies to an individual operator and to a specific airframe-engine combination of that operator’s fleet. The approval, in general, is not transferable with the aircraft, and EDTO with a transferred aircraft should be the subject of an approval by the State of the Operator.

5.1.8 The maximum diversion time is the range (expressed in time) from a point on a route to an en-route alternate aerodrome up to which the AAC will grant approval. When approving the operator’s maximum diversion time, AAC will need to consider not only the capable range of the aircraft, taking into consideration any limitation of the aeroplanes type certificate, but also the operator’s previous experience on similar aircraft types and routes.

5.2 Threshold time

5.2.1 The threshold time it is a flight time to an en-route alternate aerodrome, which is established by the AAC in CV-CAR 8. EDTO threshold beyond which particular consideration should be given to the aeroplane capability as well as the operator's relevant operational experience, before granting an EDTO approval.

Figure 7: Generic EDTO graphical representation for aeroplanes with two turbine engines.

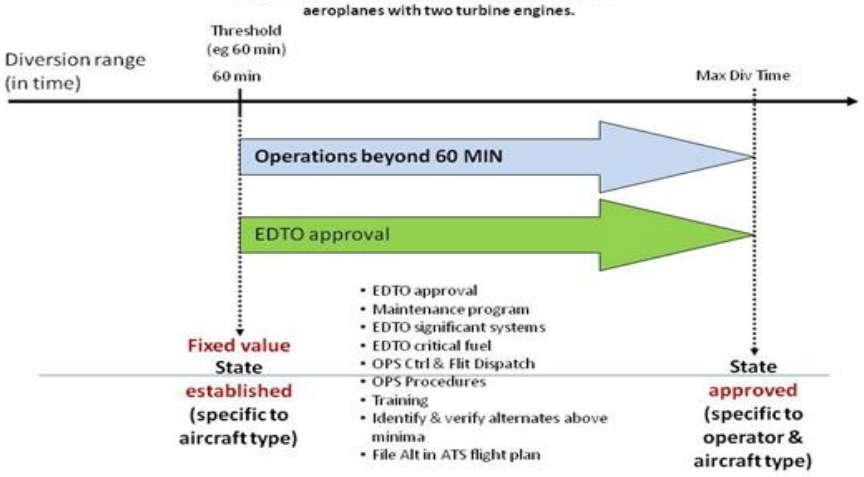
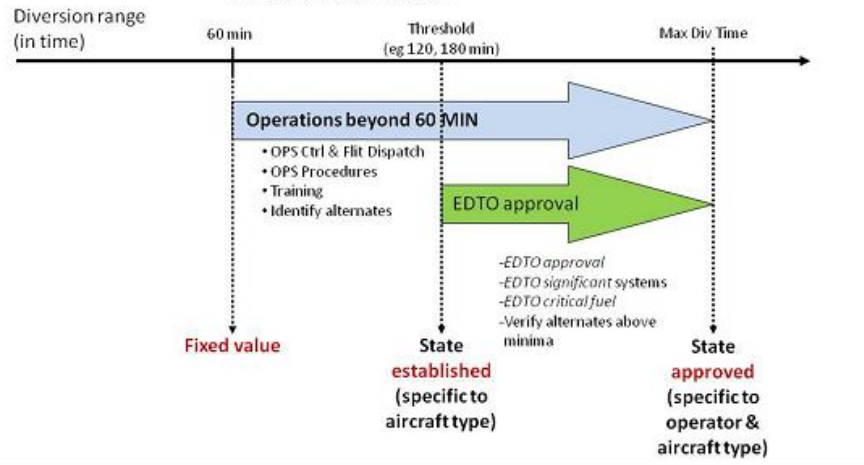


Figure 4: Generic EDTO graphical representation for aeroplanes with more than two turbine engines.



5.3 Maximum diversion time

5.3.1 It should be understood that the maximum diversion time approved in accordance with CV-CAR 8 should take into consideration the most limiting EDTO significant system time limitation, if any, indicated in the Aeroplane's Flight Manual (directly or by reference) for a particular aeroplane type and the operator's operational and EDTO experience, if any, with the aeroplane type, or if relevant with another aeroplane type or model.

6. APPROVAL PROCEDURES

6.1 Application for EDTO operational approval

6.1.1 Application for an EDTO approval is regulated under CV-CAR 8. The applications for approval to conduct EDTO should be made using AAC form FS.DSV.12, with the required supporting data. At least 90 days should be allowed for processing by AAC, particularly with new applications. It should be noted that the information requested in the form is comprehensive and a complete compilation will assist operators in the planning of these operations.

6.1.2 The EDTO approval process for transport category aeroplanes operated by an air operator in an international air transport service. For aeroplanes with two engines to be eligible for EDTO, the specified airframe/engine combination must have been certified to the airworthiness standards

of Transport Category aeroplanes Federal Aviation Regulation (FAR) Part 25, the EASA CS25 or the equivalent acceptable by the AAC.

6.2 EDTO approval process - aeroplanes with two turbine engines

6.2.1 The approval process in order to gain AAC EDTO approval can be divided into two steps.

(1) Eligibility for EDTO. The applicant must show that the design features of the particular airframe-engine combination are suitable for the intended operations. The considerations for type design approval are currently detailed in the FAR Part 25/33, the EASA CS-25 and associated advisory material.

(2) Capability for EDTO. The applicant must demonstrate that an airframe-engine combination, having been recognised as eligible for EDTO, also has a level of reliability appropriate to the intended operation. Manufacturer's or operator's reliability monitoring programs may be taken into account for this purpose.

6.2.2 The Authority responsible for the certification of the airframe-engine combination type design will include the consideration of extended range operation in its normal monitoring and design change approval functions

6.3 Evidence of type design approval – aeroplanes with two turbine engines

6.3.1 Evidence that the type design of the aeroplane is approved for EDTO is normally reflected by a statement in the Aircraft Flight Manual (AFM) and Type Certificate Data Sheet (TCDS) or Supplemental Type Certificate (STC), which contains directly, or by reference, the following information, as applicable:

(1) special limitations (if necessary), including any limitations associated with a specific maximum diversion time;

(2) additional markings or placards (if required);

(3) reference to the performance section of AFM;

(4) specific EDTO equipment installation, and related flight crew EDTO procedures;

(5) description or reference to a document containing the approved aeroplane configuration, maintenance and procedures (CMP) standards.;

(6) the airborne equipment, installation, and flight crew procedures required for extended range operations;

(7) a statement to the effect that: “The type design reliability and performance of this airframe-engine combination has been evaluated in accordance with XXX (applicable airworthiness code) and found suitable for (state maximum diversion time) extended range operations with the incorporation of the approved aeroplane configuration CMP standard. This finding does not constitute approval to conduct extended range operations”.

6.3.2 CV-CAR 5.B110 (a) states that “The Authority will not issue type certificates, production certificates or other related approvals for aircraft or aeronautical products until such time an application is made and the Authority provides suitable regulations or provisions for the issuance of an airworthiness certificate, or airworthiness document as appropriate for the product concerned.”. Same rule further states in paragraph b) that “An applicant intending to import a first

of type aircraft or aeronautical product to Cabo Verde shall apply to the Authority for the issuance of an Acceptance Type Certificate, in a form and manner prescribed by the Authority". Therefore, each applicant for extended range operations approval shall apply for an Acceptance Type Certificate for the particular airframe-engine combination based on the original Type Design Certification as required by CV-CAR 5.

6.3.3 AAC does not evaluate airframe/engine combination design features, or their reliability, for the suitability of EDTO. However for an aircraft with a type acceptance certificate issued under CV-CAR 5 base on a type certificate issued by the National Airworthiness Authority (NAA), for a country other than Cabo Verde, of the state of type design approvals for EDTO are acceptable by AAC.

Note: Refer to the applicable code of regulations when conducting the aircraft conformity inspection.

6.4 Modifications of type design – aeroplanes with two turbine engines

6.4.1 Modifications or maintenance actions to achieve or maintain the reliability objective of EDTO for the airframe/engine combination are incorporated into the design CMP standard document.

6.4.2 Approval is required for additional modifications or maintenance actions generated by an operator or manufacturer of the aeroplane.

6.4.3 Any significant problems which adversely affect extended range operation will be corrected. Modifications or maintenance actions to achieve or maintain the reliability objective of extended range operations for the airframe-engine combination will be incorporated into the design CMP standard document. The Authority will co-ordinate this action with the affected manufacturer and operator

6.4.4 The operator or manufacturer (as appropriate) must thoroughly evaluate such changes to ensure that they do not adversely affect reliability or conflict with requirements for EDTO approval.

6.4.5 The Airworthiness Directive (AD) process may be utilised as necessary to implement a CMP standard change.

6.5 Continuing airworthiness – aeroplanes with two turbine engines

6.5.1 The type design EDTO approval holder must periodically review the in-service reliability of the airframe-engine combination. Whenever an urgent problem makes it necessary, the AAC may require that the type design CMP standard be revised to achieve and maintain the desired level of reliability and safety of the EDTO. In effect, the CMP standards prior to a revision will no longer be considered suitable for continued EDTO.

6.5.2 The type design CMP standard which establishes the suitability of an aeroplane for extended range operation defines the minimum standard for the operation. Additional modifications or maintenance actions generated by an operator or manufacturer to enhance or maintain the continued airworthiness of the aeroplane must be made through the normal approval process. The operator or manufacturer (as appropriate) should thoroughly evaluate such changes to ensure that they do not adversely affect reliability or conflict with requirements for extended range approval.

6.5.3 The CMP standards and their revision may require priority actions to be implemented before the next EDTO flight, and other actions to be implemented according to a schedule acceptable to AAC.

6.6 Operations approval (airworthiness) – aeroplanes with two turbine engines

6.6.1 The type design approval does not reflect a continuing airworthiness or operational approval to conduct EDTOs; therefore, before approval, each operator must demonstrate the ability to maintain and operate the aeroplane so as to achieve the necessary reliability and to train its personnel to achieve competence in EDTO (see section 9 of this TC).

6.6.2 To maintain airworthiness approval for specific extended range operations, an operator must show compliance with the latest revision of the applicable CMP standards and any applicable ADs and Service Bulletins.

7. OPERATIONAL APPROVAL CONSIDERATIONS

7.1 General

7.1.1 Three levels of operational approval are used for two-engine aeroplanes:

(1) EDTO with a maximum diversion time from 60 minutes up to 180 minutes to an en- route alternate (at the approved OEI cruise speed);

(2) EDTO with a maximum diversion time from 180 minutes up to 240 minutes to an en- route alternate (at the approved OEI cruise speed);

(3) EDTO with a maximum diversion time above 240 minutes (at the approved OEI cruise speed).

7.1.2 From 1st July 2015 an EDTO approval will be required for aeroplanes with more than two engines for operations with a maximum diversion time more than 180 minutes (at the approved AEO cruise speed).

Note: In the case of EDTO flights with maximum diversion times beyond 180 minutes, additional flight dispatch requirements apply.

7.2 Methods for obtaining EDTO approval for operations with transport category aeroplanes with two turbine engines

7.2.1 There are two methods for obtaining an EDTO approval, depending on the availability and amount of prior experience with the candidate airframe/engine combination:

(1) “In-service” EDTO approval:

(a) An “in-service” EDTO approval is when the operator has accumulated over one year of direct in-service experience with the aircraft (in that case, the operator may apply for a diversion time of 120 min maximum), or when the operator has accumulated over one year of EDTO experience (at up to 120 minute Maximum Diversion Time) with the aircraft (in that case, the operator may apply for a diversion time of 180 min maximum).

(b) The required amount of prior in-service experience listed above may be reduced (or increased) at the discretion of the AAC.

Note: approval for EDTO operations beyond 180 min diversion time requires prior approval for 180 min EDTO operations. Approval for EDTO operations beyond 240 min diversion time requires a minimum of 2 years of experience with 180 min or higher EDTO operations.

(2) “Accelerated” EDTO approval. An “accelerated” EDTO approval is either when the operator plan to start EDTO with less than one year of direct in-service experience with the aircraft, or when the operator has accumulated direct in-service experience with the aircraft but plan to conduct EDTO beyond 120 minutes with less than one year of 120-min Diversion Time EDTO experience with the aircraft. The operator may apply for any diversion time up to 180 min, and may start EDTO at entry into service.

Note: approval for EDTO operations beyond 180 min diversion time requires prior experience with 180 min EDTO operations

7.3 Operational assessment process

7.3.1 A comprehensive assessment will be made of the operator's ability to conduct EDTO. This will include, but will not be limited to:

(1) past performance;

(2) flight crew training and experience;

(3) maintenance program;

(4) aircraft certification status.

7.3.2 The data provided with the request must substantiate the operator's ability and competence to safely conduct and support these operations, and must include the means used to satisfy the considerations outlined in this section. Any reliability assessment obtained (either through analysis or service experience) will be used as guidance in support of operational judgements regarding the suitability of the intended operation.

7.3.3 Assessment of the operator's propulsion system reliability – aeroplanes with two turbine engines

7.3.4 An assessment will be made to ensure the applicant’s ability to achieve and maintain a level of propulsion system reliability acceptable for EDTO approval.

7.3.5 This assessment should include trend comparisons of the operator's data with other operators as well as the world fleet average values, and the application of a qualitative judgement that considers all of the relevant factors. AAC will need to assess whether the operator’s past experience and compliance record is acceptable for EDTO; or, alternatively, whether the operator has established the processes necessary for successful and reliable EDTO, and shows that such processes can be successfully applied throughout such operations.

7.3.6 Engineering modifications and maintenance program considerations – aeroplanes with two turbine engines
Although these considerations are normally part of the operator's continuing airworthiness program, the maintenance and reliability program may need to be supplemented in consideration of the special requirements of EDTO. The following items, as part of the operator's program, will be reviewed to ensure that they are adequate for EDTO.

(1) Engineering modifications. The operator must provide to AAC all titles and numbers of all modifications, additions, and changes which were made in order to substantiate the incorporation of the CMP standard in the aeroplanes used in EDTO.

(2) Maintenance procedures. Following approval of the changes in the maintenance and training procedures, substantial changes to the procedures, practices, or limitations established to qualify for EDTO must be submitted to AAC at least two months before such changes may be adopted.

(3) Reliability reporting for aeroplanes:

(a) The reliability reporting program, as supplemented and approved, must be implemented prior to, and continued after the approval of EDTO;

(b) Data from this process must result in a suitable summary of problem events, reliability trends and corrective actions and be provided regularly to AAC and to the relevant airframe and engine manufacturers.

(4) Implementation. Approved modifications and inspections, which would maintain the reliability objective for the propulsion and airframe systems as a consequence of AD actions and/or revised CMP standards, must be promptly implemented. Other recommendations made by the engine and airframe manufacturers must also be considered for prompt implementation. This would apply to both installed and spare parts.

Note: In principle, the CMPs do not repeat ADs. An operator needs to ensure compliance with both the ADs applicable to the aeroplane and the CMP standards when operating EDTO. Other recommendations made by the engine and airframe manufacturers should also be considered for prompt implementation. This would apply to both installed and spare parts

(5) Control process:

(a) Procedures, and a centralised control process, must be established which would prevent:

(i) an aeroplane being released for EDTO after propulsion system shutdown; or

(ii) EDTO significant system failure on a previous flight; or

(iii) significant adverse trends in system performance, without appropriate corrective action having been taken.

(b) Confirmation of such action as being appropriate may, in some cases, require the successful completion of one or more non-revenue or non-EDTO revenue flights (as appropriate) prior to being released on an EDTO.

(c) As an alternative, the first 60 minutes of an EDTO flight can be used as a verification flight.

(6) Programs.The maintenance program used must ensure that the airframe and propulsion systems will continue to be maintained at the level of performance and reliability necessary for EDTO, including such programs as engine condition monitoring and engine and auxiliary power unit (APU) (if required for EDTO) and oil consumption monitoring.

(7) Qualified personnel. The maintenance program must ensure that adequate numbers of qualified personnel are trained and authorised to competently perform the maintenance program.

8. EDTO OPERATIONS MANUAL SUPPLEMENT

8.1.1 The EDTO operations manual supplement or its equivalent material in the operations manual, and any subsequent amendments, are subject to approval by the Competent Authority. The Authority will review the actual EDTO in-service operation. Amendments to the Operations Manual may be required as a result. Operators should provide information for and participate in such reviews, with reference to the (S)TC holder where necessary. The information resulting from these reviews should be used to modify or update flight crew training programmes, operations manuals and checklists, as necessary.

8.1.2 An example outline of EDTO Operations Manual Supplement content is provided in ANNEX C to this TC.

9. FLIGHT PREPARATION AND IN-FLIGHT CONSIDERATIONS

9.1.1 The flight preparation includes completion of the flight release. The flight release can have many steps and take many different forms such as a computerised flight plan with references to the EDTO alternate aerodromes for the flight, and the approved EDTO maximum diversion time under which the flight has been released or dispatched. The release will also take into account the MEL, weather and NOTAM information relevant to the flight. The following flight release considerations apply to EDTO.

9.2 Minimum equipment list

9.2.1 System redundancy levels appropriate to EDTO must be reflected in the Master Minimum Equipment List (MMEL). An operator's MEL may be more restrictive than the MMEL, considering the kind of EDTO proposed and equipment and service problems unique to the operator. Systems considered to have a fundamental influence on flight safety may include, but are not limited to, the following:

(1) electrical, including battery

(2) hydraulic

(3) pneumatic

(4) flight instrumentation

(5) fuel

(6) flight control

(7) ice protection

(8) engine starts and ignition

(9) propulsion system instruments

(10) navigation and communications

(11) auxiliary power unit

(12) air conditioning and pressurisation

(13) cargo fire suppression

(14) engine fire protection

(15) emergency equipment

(16) any other equipment necessary for EDTO.

9.2.2 MEL considerations for aeroplanes with more than two engines on an EDTO should include reference to system requirements appropriate for the approved maximum diversion time (e.g. communications, fuel and cargo fire suppression systems requirements). Engine and APU oil consumption should also be considered.

9.3 Communication and navigation facilities

9.3.1 An aeroplane must not be released for an EDTO unless communications facilities are available to provide, under normal conditions of propagation at the appropriate OEI cruise altitudes, reliable:

(1) two-way communications between the aeroplane and the operator's operational control centre;

(2) two-way communication between the aeroplane and the appropriate air traffic service (ATC) unit over the planned route of flight
(3) over the routes to any suitable alternate to be used in the event of diversion
(4) non-visual ground or other navigation aids are available and located to provide the navigation accuracy necessary for the planned route and altitude of flight, and the routes to any alternate aerodrome and altitudes to be used (taking into account the navigation equipment installed in the aeroplane)
(5) visual and non-visual aids are available at the specified alternates for the anticipated types of approaches and operating minima.

9.3.2 Where EDTO approval exceeds 180 minutes, a second means of communication is required.

9.4 Fuel and Oil Supply

9.4.1 Unlike the area of operation, which is determined under standard conditions in still air, the fuel planning should consider the expected meteorological conditions along the planned route. Prior to dispatching an aeroplane on an EDTO flight, both a standard and EDTO fuel requirement, for the planned route, should be determined. The fuel quantity required for dispatch is the greater of the two resulting fuel requirements

9.4.2 An aeroplane should not be released on an extended range operation unless it carries sufficient fuel and oil to meet the requirements of CV-CAR 8 and any additional fuel that may be determined in this instruction.

9.4.3 An aeroplane should not be dispatched on an EDTO flight unless it carries sufficient fuel and oil to meet applicable regulatory requirements, including additional contingency fuel reserves that may be determined in accordance with section 8.3. E (Critical fuel reserves). In computing fuel and oil requirements, at least the following should be considered:

(1) Current forecast winds and meteorological conditions along the expected flight path at the appropriate one-engine-inoperative cruise altitude and throughout the approach and landing;

(2) Any necessary operation of ice protection systems and performance loss due to ice accretion on the unprotected surfaces of the aeroplane;

(3) Any necessary operation of Auxiliary Power Unit (APU);

(4) Loss of aeroplane pressurisation and air conditioning; consideration should be given to flying at an altitude meeting oxygen requirements in the event of loss of pressurisation;

(5) An approach followed by a missed approach and a subsequent approach and landing;

(6) Navigational accuracy necessary; and

(7) Any known Air Traffic Control (ATC) constraints;

(8) APU oil consumption and servicing should be considered in accordance with CMP document requirements.

9.4.4 Critical Fuel Reserves

(1) In establishing the critical fuel reserves, the applicant is to determine the fuel necessary to fly to the most critical point and execute a diversion to a suitable alternate under the conditions outlined in section 8.3.D, the 'Critical Fuel Scenario'. These critical fuel reserves should be compared to the normal applicable operational rule requirements for the flight. If it is determined by this comparison that the fuel to complete the critical fuel scenario exceeds the fuel that would be on board at the most critical point, as determined by applicable operational rule requirements, additional fuel should be included to the extent necessary to safely complete the critical fuel scenario.

(2) In consideration of the items listed in section 8.3.C, the critical fuel scenario should allow for:

(a) a contingency figure of 5 per cent added to the calculated fuel burn from the critical point to allow for errors in wind forecasts, a 5 per cent penalty in fuel mileage **,

(b) any Configuration Deviation List and/or Minimum Equipment List (MEL)items, both airframe and engine anti-icing; and

(c) account for ice accumulation on unprotected surfaces if icing conditions are likely to be encountered during the diversion.

(3) If the APU is a required power source, then its fuel consumption should be accounted for during the appropriate phase(s) of flight.

*(** or operator's demonstrated value for in-service deterioration in cruise fuel mileage)*

(4) For an air operator that does not have an approved fuel consumption monitoring program to monitor the aeroplane in-service deterioration of cruise fuel burn performances and includes fuel supply calculations sufficient to compensate for such deterioration, increase the fuel supply by 5 percent.

9.4.5 Critical Fuel Scenario

(1) Calculation of the critical fuel reserve requires the determination of the failure scenario that is the most operationally critical, considering time and aeroplane configuration. Any failure or combination of failures not shown to be extremely improbable should be considered.

The critical fuel reserve is the fuel required taking into account the items listed in paragraph 8.3.C and:

(a) To proceed from the most critical point to an EDTO alternate aerodrome following the occurrence of the most operationally critical event(s); and
(b) Upon reaching the EDTO alternate aerodrome, to descend to 1,500 feet above the aerodrome, hold for 15 minutes, initiate an instrument approach and land.

(2) The following describes a scenario for a diversion at the most critical point. The applicant should confirm the scenario to be used when calculating the critical fuel reserve necessary. it is operationally the most critical when considering both time and aeroplane configuration (e.g., two-engine versus one-engine at 10 000 feet non-standard aeroplane configuration not shown to be Extremely Improbable)

(a) At the critical point, consider simultaneous failure of one propulsion system and the pressurisation system (critical point based on time to a suitable alternate at the approved one-engine-inoperative cruise speed).

(b) Immediate descent to and continued cruise at 10 000 feet at the relevant one- engine-inoperative cruise speed or continued cruise above 10 000 feet if the aeroplane is equipped with sufficient supplemental oxygen in accordance with CV-CAR 8.

(c) Upon approaching the EDTO en-route alternate, descent to 1 500 feet above destination, hold for 15 minutes, initiate an approach followed by a missed approach and then execute a normal approach and landing.

9.5 EDTO alternate aerodromes

9.5.1 An aeroplane must not be released for an EDTO unless the required take-off, destination and alternate aerodromes (including EDTO alternate aerodromes) to be used in the event of a propulsion system failure or aeroplane system failure(s) which require a diversion, are listed in the cockpit documentation and specified in the operational flight plan.

9.5.2 Since these EDTO alternates serve a different purpose than the destination alternate aerodrome, and would normally be used only in the event of an engine failure or aeroplane system failures, an aerodrome must not be listed as an EDTO alternate unless the requirements for alternate Aerodromes (ANNEX B)- physical requirements are met.

9.5.3 The aerodrome services and facilities are adequate to permit the conduct of an instrument approach procedure to the runway expected to be used while complying with the applicable aerodrome landing minima i.e. approach lights requirements etc.

9.5.4 Prior to dispatch of the flight, the latest available forecast weather conditions for the period commencing at the earliest time of landing and ending at the latest time of landing at that aerodrome equals or exceeds the authorised alternate aerodrome planning minima requirements for EDTO alternate aerodromes in accordance with CV-CAR 8. AAC may approve an AOC holder to use global positioning system (GPS)/ area navigation (RNAV) based instrument approach and low visibility category (CAT) II or CAT III approaches and landing procedures at an EDTO alternate aerodrome.

9.5.5 In addition, for the same period, the forecast crosswind component (including gusts) for the landing runway expected to be used must not:
(1) exceed the manufacturer's recommended crosswind for a one-engine inoperative landing (if published); or

(2) the maximum demonstrated crosswind (whichever is less), taking into account the runway condition (dry, wet or contaminated).

9.5.6 When planning and conducting the flight, adverse weather conditions at EDTO alternates having forecast probabilities of less than 40% may be disregarded, except for phenomena such as:

(1) Fog;

(2) Mist;

(3) Dust;

(4) Sand;

(5) Smoke;

(6) Haze restricting visibility below the minima.

9.5.7 When planning and conducting the flight, adverse weather conditions at EDTO alternates forecasting intermittent (INTER) or temporary (TEMPO) should be taken into account when determining the amount of fuel to be carried.

9.5.8 During the course of the flight, the operator must inform the flight crew of any significant changes in conditions at required EDTO alternates. Before proceeding beyond the EDTO entry point, the forecast weather for the time periods established above, the following must be evaluated:

(1) aeroplane status (e.g. inflight un-serviceability's or MEL items that may affect the operation)

(2) fuel remaining;

(3) runway surface conditions;

(4) landing distances;

(5) aerodrome services and facilities at designated EDTO alternates.

9.5.9 If any conditions are identified prior to the EDTO entry point (i.e. weather forecast below landing minima) which would preclude a safe approach and landing, the pilot-in-command (PIC) must be notified and an acceptable EDTO alternate selected where a safe approach and landing can be made.

9.5.10 After an EDTO flight has proceeded beyond the applicable EDTO entry point, the operator must keep the PIC informed of any significant changes in conditions at required EDTO alternates. The pilot may continue the flight as planned if the meteorological forecast is subsequently revised below the landing minima for a required EDTO alternate aerodrome.

9.5.11 Operators should provide flight crews with information on adequate aerodromes appropriate to the route to be flown which are not suitable aerodromes, such as the weather forecast for these aerodromes does not meet the applicable requirements of ANNEX B - alternate aerodrome planning minima. Pilots should monitor the conditions at adequate aerodromes relevant to the flight throughout the flight.

9.5.12 Aerodrome facility information and other appropriate planning data concerning these aerodromes should be provided to flight crews in the event that a diversion is required at any stage during the flight.

9.5.13 For EDTO planning purposes, the minimum International Civil Aviation Organization (ICAO) rescue and firefighting services (RFFS) CAT 4 (or equivalent) must be available within 30 minutes notice at each aerodrome listed as an EDTO alternate aerodrome.

9.6 Aeroplane performance data

9.6.1 The operator's operations manual should contain sufficient data to support the most critical fuel scenario (ensuring reserves) and area of operations calculation (i.e. maximum diversions distance rings).

9.6.2 The following data should be based on information provided in the AFM:

(1) Detailed OEI performance data, including fuel flow for standard and non-standard atmospheric conditions, as a function of airspeed and power setting (where appropriate) covering:

(a) approved OEI cruise speed

(b) drift down (includes net performance)

(c) cruise altitude coverage (including 10,000ft.)

(d) holding

(e) altitude capability (including net performance)

(f) missed approach.

(2) Detailed AEO performance data, including nominal fuel flow data, for standard and non-standard atmospheric conditions, as a function of airspeed and power setting (where appropriate) covering:

(a) approved AEO cruise speed

(b) cruise altitude coverage (including 10,000ft.)

(c) holding

(3) Details of any other conditions relevant to EDTO which can cause significant deterioration of performance, such as ice accumulation on the unprotected surfaces of the aeroplane, Ram Air Turbine (RAT) deployment, etc.

9.7 Aeroplane performance

9.7.1 In determining an EDTO area of operation, for any given airframe/engine combination, operators will nominate the performance data used (altitudes, airspeeds, thrust settings and fuel flow). The resulting aircraft performance must ensure compliance with terrain and obstacle clearance requirements.

9.8 Flight dispatcher and operational control

9.8.1 For EDTO flights flight dispatcher and operational control:

(1) provide operational control exercising responsibility for initiation, continuation, termination or diversion of an EDTO flight

(2) incorporate flight dispatch procedures for the control and supervision of EDTO flights.

9.8.2 Flight dispatch officers:

(1) assist the PIC in flight preparation and provide relevant information

(2) assist the PIC in preparing the operational flight plan.

(3) furnish the PIC while in flight:

(4) with information which may be necessary for the safe conduct of the flight

(5) with the appropriate information prior to the EDTO entry point.

(6) In the case of an emergency:

(7) initiate procedures as outlined in the operations manual

(8) convey safety related information to the PIC that may be necessary for the safe conduct of the flight.

10. FLIGHT CREW TRAINING AND DOCUMENTATION

10.1 Adequacy of flight crew training and operations manuals

10.1.1 An operator should ensure that prior to conducting EDTO, each crew member has completed EDTO training and checking successfully in accordance with a syllabus approved by AAC and detailed in the operations manual. See ANNEX A to this TC for an example of EDTO training syllabus.

10.1.2 The training should be aeroplane type and area of operation specific in accordance with the applicable operational requirements.

10.1.3 The operator should ensure that flight crew members are not assigned to operate EDTO routes for which they have not successfully completed the required training, including route qualification training

10.2 Reviews

10.2.1 AAC will review in-service experience of EDTO significant systems for aeroplanes with two engines. The review will include system reliability levels and individual event circumstances (including actions taken by the crew in response to equipment failures or malfunctions). The purpose of the review will be to verify the adequacy of information provided in training programs and operations manuals. The operator should provide information for, and participate in, these reviews.

10.2.2 AAC may use the information resulting from these reviews to require the operator to amend flight crew training programmes, operations manuals and checklists, as necessary.

10.3 Flight crew training and evaluation program

10.3.1 The operator's training program must provide initial and recurrent training for flight crew members for EDTO operations. This training should be followed by subsequent evaluations and proficiency checks.

10.3.2 An example of a training syllabus can be found in ANNEX A to this TC.

10.3.3 Specific initial and recurrent training to prepare flight crews to evaluate probable propulsion and airframe systems failures must be conducted. The goal of this training must be to establish crew competency in dealing with the most probable operating contingencies. (See section 10.9 – Diversion decision making)

10.3.4 The use of appropriate navigation and communication systems, including appropriate flight management devices is vital to this training.

10.4 Specific EDTO training requirements

10.4.1 The flight crew must be provided with detailed initial and recurrent training which emphasises abnormal and emergency procedures to be followed in the event of unforeseeable failures for each area of operation, including:

(1) procedures for single and multiple failures in-flight affecting EDTO entry and diversion decisions.

(2) For example, if standby sources of electrical power significantly degrade cockpit instrumentation, then training which simulates approach with the standby generator as the sole power source should be conducted during initial and recurrent training

(3) operational restrictions associated with these failures (including any applicable MEL considerations)

(4) crew incapacitation

(5) use of emergency equipment (including cold weather gear and ditching equipment)

(6) procedures to be followed in the event that there is a change in conditions at designated EDTO en-route alternates for the flight, which would preclude safe approach and landing

(7) understanding and effective use of approved additional or modified equipment required for EDTOs

(8) flight crew procedures unique to EDTO

(9) fuel management procedures to be followed during the en-route portion of the flight. O These procedures must provide for an independent cross-check of fuel quantity indicators, (e.g. fuel flows could be used to calculate fuel burned and compared with indicated fuel remaining)

(10) fuel management accounting for discrepancies between planned fuel remaining and actual fuel remaining

(11) passenger recovery plan.

10.5 EDTO check program

10.5.1 The objective of the EDTO check program should be to ensure standardised flight crew practices and procedures and also to emphasise the special nature of EDTO. Only those with a demonstrated understanding of the unique requirements of EDTO should be designated as check pilots for EDTO.

10.6 Flight dispatcher

10.6.1 Dispatchers provide assistance to the PIC in pre-flight preparations and act as a close link between the aircraft in-flight and the ground services and also between the crew members and the operator's other ground staff.

10.6.2 Flight operations personnel that are involved in the dispatch of EDTO flights must be competently trained and recent in duties related to EDTO dispatch and in-flight following, including passenger recovery plan.

10.7 Check Airman used in EDTO

10.7.1 The operator should designate check airmen specifically for EDTO. The objective of the EDTO check airman program should be to ensure standardized flightcrew practices and procedures and also to emphasize the special nature of EDTO. Only airmen with a demonstrated understanding of the unique requirements of EDTO should be designated as a check airman.

11. OPERATIONAL LIMITATIONS

11.1 Area of operation

11.1.1 An operator is, when specifically approved, authorised to conduct EDTO flights within an area where the diversion time, at any point along the proposed route of flight, to an adequate EDTO en-route alternate aerodrome, is within the operator's approved diversion time (under standard conditions in still air) at the approved one-engine-inoperative cruise speed.

11.2 Flight release limitation

11.2.1 The flight release limitation should specify the maximum diversion time from an EDTO alternate aerodrome for which an operator can conduct a particular EDTO. The maximum diversion time at the approved OEI (or AEO for aeroplanes with more than two engines) cruise speed must not be any greater than the value stated in the Air Operator Certificate (AOC) holder's EDTO approval issued by AAC.

11.3 Use of maximum diversion time

11.3.1 The procedures established by the operator must ensure that EDTO is limited to flight plan routes where the approved EDTO maximum diversion time to EDTO alternates can be met under standard conditions in still air. Operators must provide:

(1) company procedures to state that, upon occurrence of an in-flight shut down of an engine in a two-engine aeroplane, the PIC, considering all the relevant factors must promptly initiate diversion to, and land at, the nearest suitable aerodrome

(2) a practice to be established such that, in the event of a single or multiple EDTO significant system failure, the pilot will initiate the diversion procedure to fly to, and land at, the nearest suitable aerodrome. Taking into account the nature of the diversion and suitability of aerodromes, unless it has been justified that no substantial degradation of safety results from continuation of the planned flight

11.4 Requirements for EDTO approval

11.4.1 The requirements for EDTO approval are:

(1) an operator's aeroplane must not be operated on an EDTO flight unless authorised in the EDTO approval issued by AAC for both maintenance and operations

(2) from 1st July 2015, operators of aeroplanes with more than two turbine engines will require approval to operate with EDTO maximum diversion times greater than the threshold time of 180 minutes.

(3) passenger carrying operations must comply with the operational and process requirements specified in the EDTO rules in CV-CAR 8 (these aeroplane types are not required to be EDTO type design approved)

11.4.2 Following review and concurrence by AAC, an operational proving flight must be conducted in accordance with any additional guidance specified in the review and concurrence. When the proving flight has been evaluated and found acceptable, the operator will be authorised to conduct EDTO with the specified airframe/engine combination. AAC will issue an approval to conduct EDTO containing operations specifications and appropriate limitations.

11.5 Validation of operator EDTO maintenance and operations capability

11.5.1 The operator must demonstrate that they have the competence and capability to safely conduct, and adequately support, the intended operation. Before being granted EDTO operational approval, the operator must provide evidence that:

(1) the EDTO maintenance checks, servicing, and programs are properly conducted and certified by qualified personal

(2) EDTO flight release practices, policies, and procedures are established for operations to and from representative departure and destination aerodromes.

11.6 EDTO proving flight for aeroplanes with two engines.

11.6.1 A proving flight, in the aeroplane or an approved flight simulator (as determined by AAC on a case-by-case basis) must also incorporate demonstration of the following emergency procedures:

(1) total loss of thrust of one engine

(2) total loss of pressurization

(3) total loss of normal generated electrical power

(4) any other condition considered to be equivalent in airworthiness, crew workload, or performance risk.

Note: Alternative electrical power sources, such as the APU and electrical systems designed to operate with the total loss of normal generated electrical power, are essential for these demonstrations.

11.7 Criteria for EDTO beyond 180 minutes - aeroplanes with two-turbine engines

11.7.1 Each operator requesting approval to conduct EDTOs beyond 180 minutes must hold a current 180 minutes EDTO approval for the airframe/engine combination listed in their application. The amount of service experience may be increased or decreased after a review of the operator's experience, taking into account all factors, including the number of sectors. Before approval, the operator's capability to conduct operations and implement effective EDTO programs in accordance with the criteria detailed in section 7 of this instruction will be examined.

11.7.2 The record of the operator in conducting its 180 minute program will be considered when granting approvals beyond 180 minutes diversion time. The area of operation will be defined by a specified maximum diversion time to an adequate aerodrome at the approved one-engine- inoperative cruise speed.

11.7.3 The release limitation will be a specified maximum diversion time to an EDTO alternate at the approved one-engine-inoperative speed.

11.8 Release considerations

11.8.1 MEL. The MEL should reflect adequate levels of EDTO significant system redundancy to support the EDTO time requested. The systems listed in paragraph 5.1 of this TC must be considered.

11.8.2 Weather:

(1) An operator should verify that the weather information system utilised can be relied upon to forecast terminal and en-route weather with a reasonable degree of accuracy and reliability in the proposed area of operation.

(2) If the dispatch of a flight is delayed, pilots or operations personnel should monitor weather forecasts and aerodrome status at the nominated EDTO en-route alternate aerodromes to ensure that the weather remains within the specified planning minima requirements until dispatch.

11.9 Flight planning

11.9.1 The effects of wind and temperature for the flight (including flight at the OEI cruise altitude) must be accounted for in the calculation of equal time points. The operator's program must provide flight crew members with information on adequate aerodromes appropriate to the route to be flown which are not forecast to meet ANNEX B of this - EDTO alternate planning weather minima.

11.9.2 Aerodrome facility information and other appropriate planning data concerning these aerodromes must be provided to flight crew for use when executing a diversion.

11.10 Diversion decision making

11.10.1 The operator’s operations manual must establish procedures for flight crew outlining the criteria that indicate when a diversion or change of routing is recommended whilst conducting an EDTO.

11.10.2 Contingency procedures should not be interpreted in a way that prejudices the final authority and responsibility of the PIC for the safe operation of the aeroplane.

11.10.3 Specific instruction must be included in the operator's operations manual so that section 8.4 (EDTO Alternate aerodromes) of this is observed, with the additional provision that an EDTO alternate aerodrome must be selected within the EDTO maximum diversion time, at the approved OEI speed for aeroplanes with two engines, or the AEO cruise speed for aeroplanes with more than two engines. Factors to be considered when deciding the appropriate course of action and suitability of an aerodrome for diversion may include, but are not limited to:

(1) aircraft configuration/weight/systems status

(2) wind and weather conditions en-route to the diversion aerodrome

(3) fuel required for the diversion

(4) aerodrome condition, terrain, weather, and wind

(5) runways available and runway surface condition

(6) approach aids and lighting

(7) RFFS capability at the diversion aerodrome

(8) facilities for aircraft occupants – disembarkation & shelter provisions

(9) medical facilities

(10) pilot's familiarity with the aerodrome

(11) information about the aerodrome available to the flight crew.

11.10.4 If one engine is shut down on an aeroplane that has three or more engines the PIC may fly past the nearest suitable en-route alternate aerodrome in point of time if the PIC determines that doing so is as safe as landing at the nearest suitable aerodrome. In making a decision to fly beyond the nearest suitable en-route alternate aerodrome, the PIC should consider all relevant factors and also consider the possible difficulties that may occur if the flight is continued beyond the nearest suitable alternate. When an aeroplane with more than two engines bypasses a suitable en-route alternate, the PIC should carefully consider the risk associated with the next possible failure, which could degrade or compound the current engine inoperative condition. The next possible failure could be a system failure or another engine failure; which, in either case, would affect the flight crew work load and their possible success in completing the associated abnormal approach and landing procedures.

11.10.5 It is even possible that a contingency outside of system failure (i.e. passenger illness) could compound the flight crew work load normally associated with the current failure condition.

11.11 Communications

11.11.1 The operator must show the availability of communications services and facilities for ATC communications and communications with the dispatch office. For company communications, operators must use the most reliable voice-based communications technology available. Rapid and reliable ATC communications are determined by the facilities operated by ATC units in the

areas of operations. Operators must consider enhancements to their operational control system as soon as they become feasible.

11.11.2 Communication systems in addition to those normally required are necessary for flights where the EDTO maximum diversion time is more than 180 minutes. Satellite communication (SATCOM) and aircraft communications addressing and reporting system (ACARS) may be used to supplement communication systems.

11.11.3 If an EDTO flight includes polar operations, the operator must consider the limitations of SATCOM and high frequency (HF) communication systems in the polar area.

11.12 Automated system monitoring

11.12.1 The provision of automated aeroplane system status monitoring should be considered in order to enhance the flight crew's ability to make timely diversion decisions.

11.13 Navigation facilities

11.13.1 Operators must show the availability of navigation facilities is adequate for the operation, taking into account the navigation equipment installed on the aeroplane, the navigation accuracy necessary for the planned route and altitude of the flight, and the routes and altitudes to the aerodromes the operator may designate as EDTO alternates. Navigation facilities required to ensure a safe approach and landing must be available.

11.13.2 If an EDTO flight includes polar operations and areas of magnetic unreliability, the operator must consider:

(1) grid navigation in regards to flight planning,

(2) available ground based navigational aids for en-route navigation

(3) approach and landing requirements

(4) specific aeroplane operational procedures.

11.14 Weather information system

11.14.1 An operator should verify that the weather information system which it utilises can be relied on to forecast terminal and en-route weather with a reasonable degree of accuracy and reliability in the proposed area(s) of operation. Such factors that should be evaluated are:

(1) Staffing

(2) dispatcher training

(3) sources of weather reports and forecasts

(4) a record of forecast reliability (when possible).

11.15 Passenger recovery plan

11.15.1 The operator’s formal passenger recovery plan for general application required under CV-CAR 8 should be reviewed and determined to be satisfactory for the proposed EDTO in the event of an unplanned diversion and disembarkation.

11.15.2 The recovery plan should address the safety and wellbeing of passengers and crew at the diversion aerodrome, and include a plan to transfer the passengers and crew from that aerodrome safely and without delay.

11.15.3 The operator should be prepared to demonstrate the processes required to initiate and carry out its passenger recovery plan before EDTO approval is granted. The operator is expected to maintain the accuracy and completeness of its recovery plan.

12. CONTINUING AIRWORTHINESS CONSIDERATIONS

12.1 Applicability

12.1.1 The requirements of this section apply to the continuing airworthiness management of the aircraft for which an EDTO operational approval is sought, and they are to be complied with in addition to the applicable continuing airworthiness requirements CV-CAR 5 and CV-CAR 9.D. They specifically affect:

(1) Occurrence reporting;

(2) Aircraft maintenance programme and reliability programme;

(3) Maintenance Control Manual;

(4) Competence of continuing airworthiness and maintenance personnel.

12.2 Occurrence reporting

12.2.1 In addition to the items generally required to be reported in accordance with CV-CARs 5, and 9, the AOC holder must ensure that each of the following events is reported to AAC within 72 hours of the event occurring:

(1) in-flight shutdowns;

(2) diversion or turn-back;

(3) un-commanded power changes or surges;

(4) inability to control the engine or obtain desired power; and

(5) failures or malfunctions of EDTO significant systems having a detrimental effect to EDTO flight.

Note: status messages, transient failures, intermittent indication of failure, messages tested satisfactorily on ground not duplicating the failure should only be reported after an assessment by the operator that an unacceptable trend has occurred on the system

12.2.2 The report should identify as applicable the following:

(1) aircraft identification;

(2) engine, propeller or APU identification (make and serial number);

(3) total time, cycles and time since last shop visit;

(4) for systems, time since overhaul or last inspection of the defective unit;

(5) phase of flight; and

(6) corrective action.

12.2.3 The Competent Authority and the (S)TC holder should be notified within 72 hours of events reportable through this programme.

12.3 Maintenance Programme and Reliability Programme

12.3.1 The quality of maintenance and reliability programmes can have an appreciable effect on the reliability of the propulsion system and the EDTO Significant Systems. The Competent Authority should assess the proposed maintenance and reliability programme's ability to maintain an acceptable level of safety for the propulsion system and the EDTO Significant Systems of the particular airframe/engine combination.

12.3.2 Maintenance Programme:

(1) The maintenance programme of an aircraft for which EDTO operational approval is sought, should contain the standards, guidance and instructions necessary to support the intended operation. The specific EDTO maintenance tasks identified by the (S)TC holder in the Configuration, Maintenance and Procedures document (CMP) or equivalent should be included in the maintenance programme and identified as EDTO tasks.

(2) The Maintenance Program should include procedures to preclude identical maintenance actions from being applied to multiple similar elements in any EDTO maintenance significant system during the same routine or non-routine maintenance visit. Servicing of fluids and gases is not considered multiple maintenance action. The maintenance program should ensure that the airborne equipment continues to be maintained at the level of performance and reliability necessary for EDTO. Additionally:

(a) EDTO related procedures, duties, and responsibilities, such as involvement of centralized maintenance control, should be clearly defined in the operators program.

(b) An EDTO Pre-departure Service Check should be developed to verify that the airplane and certain significant items are airworthy and EDTO capable. This check should be signed for by an EDTO qualified maintenance person and accomplished prior to each scheduled EDTO flight, except following irregular operations due to non-technical issues or when exempted in the operator's approved program. This check is not precluded by any other maintenance check.

(c) Log books should be reviewed to ensure proper MEL procedures; deferred items, maintenance checks and system verification procedures have been properly performed and documented as appropriate.

(d) System redundancy levels appropriate to EDTO should be reflected in the MMEL. An operators MEL may be more restrictive than the MMEL considering the kind of EDTO operation proposed and equipment and service issues unique to the operator.

(e) A list of fleet specific EDTO maintenance significant systems should be approved by the AAC

(f) If EDTO dual maintenance actions are performed, use of adequate ground tests, separate maintenance technicians, Required Inspection Items procedures, restriction of the aircraft from EDTO flights and/or a verification flight or other approved maintenance procedures may be used to verify the airworthiness of maintenance actions prior to EDTO. This is to recognize and preclude common cause human failure modes.

(g) An EDTO Maintenance task could be an EDTO specific task or/and a maintenance task affecting an EDTO significant system. An EDTO specific task could be either an existing task with a different interval for EDTO, a task unique to EDTO operations, or a task mandated by the CMP further to the in-service experience review (note that in the case EDTO is considered as baseline in the development of a maintenance program, no "EDTO specific" task may be identified in the MRB).

(h) The maintenance programme should include tasks to maintain the integrity of cargo compartment and pressurisation features, including baggage hold liners, door seals and drain valve condition. Processes should be implemented to monitor the effectiveness of the maintenance programme in this regard.

(i) An EDTO service check should be developed to verify the status of the aeroplane and the EDTO significant systems. This check should be accomplished by an authorised and trained person prior to an EDTO flight. Such a person may be a member of the flight crew.

(j) The operator should identify all tasks that must be signed for by EDTO qualified personnel. EDTO specific tasks should either:

(i) Be identified on the operator's routine work forms and related instructions.

(ii) Parceled together and identified as an EDTO package

(k) Procedures and centralized control processes should be established which would preclude an airplane being dispatched for EDTO flights after:

(i) a propulsion system shut-down (on twin engine airplanes), significant primary airframe system failure, including non EDTO flights, of the air operator's EDTO approved aeroplane type affected; or

(ii) Adverse trend in system performance without appropriate corrective action having been taken. Confirmation of such action as being appropriate, in some cases, may require successful verification (as appropriate) prior to dispatch on an EDTO flight. The Maintenance Manager must have the authority to initiate roll back of the approved EDTO diversion time.

12.4 Reliability Programme:

12.4.1 General

The reliability programme of an EDTO operated aircraft should be designed with early identification and prevention of failures or malfunctions of EDTO significant systems as the primary goal as well as ensuring that the minimum EDTO reliability levels are maintained. Therefore the reliability programme should include assessment of EDTO Significant Systems performance during scheduled inspection/testing, to detect system failure trends in order to implement appropriate corrective action such as scheduled task adjustment.

The reliability programme must be event-orientated and incorporate:

(1) reporting procedures for significant events and trends detrimental to EDTO flights in accordance with Section 11.2 (Occurrence reporting) of this

(2) operator's assessment of propulsion systems reliability

(3) APU in-flight start programme

(4) Oil consumption programme

(5) Engine Condition Monitoring programme

(6) Verification programme

This information must be readily available for use by the air operator and the AAC Inspectors to help establish that the reliability level is adequate, and to assess the air operator's competence and capability to safely continue EDTO Operations. An EDTO reporting program must be established which ensures that the AAC inspector is notified at least monthly, on the previous month's activities or more often if adverse trends reportable through this program are identified.

12.4.2 Assessment of Propulsion Systems Reliability

The operator's assessment of propulsion systems reliability for the EDTO fleet should be made available to the AAC (with the supporting data) on at least a monthly basis, to ensure that the approved maintenance programme continues to maintain a level of reliability necessary for EDTO operations as established in section 6.

The assessment should include, as a minimum, engine hours flown in the period, in-flight shutdown rate for all causes and engine removal rate, both on a 12-months moving average basis. Where the combined EDTO fleet is part of a larger fleet of the same aircraft/engine combination, data from the total fleet will be acceptable.

Any adverse sustained trend to propulsion systems would require an immediate evaluation to be accomplished by the operator in consultation with the competent authority. The evaluation may result in corrective action or operational restrictions being applied.

A high engine in-flight shutdown rate for a small fleet may be due to the limited number of engine operating hours and may not be indicative for an unacceptable trend. The underlying causes for such an increase in the rate will have to be reviewed on a case-by- case basis in order to identify the root cause of events so that the appropriate corrective action is implemented.

If an operator has an unacceptable engine in-flight shutdown rate caused by maintenance or operational practices, then the appropriated corrective actions should be taken.

Where reliability data indicate that the propulsion system "target criteria" are no longer being met, the AAC must be notified of the corrective measures taken. Where the "minimum criteria" are no longer being met, the air operator must roll back the EDTO diversion time to that specified for the particular IFSD rate noted. An IFSD could be discounted pursuant to conditions such as:

(1) The IFSD is not the result of any action or inaction from the part of the air operator;

(2) The IFSD is not the result of any action or inaction from the part of the maintenance provider; or

(3) The IFSD is the result of an operational incident such as a bird strike at low altitude.

When discounting of IFSD, the air operator, AAC inspectors must have consensus. If required, the AAC is to consult with the Aircraft Certification Engineering Division for interpretation and/or guidance on a case-by-case basis.

Failure of an air operator to roll back the maximum diversion time when required constitutes grounds for removal of EDTO authority.

12.4.3 APU in-flight start programme

Where an APU is required for EDTO and the aircraft is not operated with this APU running prior to the EDTO entry point, the operator should initially implement a cold soak in-flight starting programme to verify that start reliability at cruise altitude is above 95%.

Once the APU in-flight start reliability is proven, the APU in-flight start monitoring programme may be alleviated. The APU in-flight start monitoring programme should be acceptable to the competent authority.

The following criteria should be included in the operator's APU in-flight start validation program as part of their overall EDTO maintenance program for each specific airframe/engine combination. APU in-flight starts should be made on flights of four hours or more when possible, subject to the following conditions:

(1) In-flight APU starts need not be performed on EDTO flights, however, the APU must be in the EDTO configuration in accordance with the applicable Configuration, Maintenance, and Procedures (CMP) document, in order for credit to be allowed.

(2) If in-flight APU starts are performed on an EDTO flight, the start may be attempted on the return leg.

(3) The start attempt should be initiated before top of descent, or at such time that will ensure a two hour cold soak at altitude.

(4) If the APU fails to start on the first attempt, subsequent start attempts may be made within the limits of the airframe and APU manufacturer design specifications.

All occurrences of an EDTO configured APU in-flight unsuccessful start attempt (which exceed the airframe and APU manufacturer design specifications) shall be reported to the AAC. All operationally required APU in-flight start failures occurring during actual EDTO operations should be reported to the AAC. The final report should include corrective actions taken as well as the status of corrective action programs, fleet upgrades, etc.

The Maintenance procedures should include the verification of in-flight start reliability following maintenance of the APU and APU components, as defined by the OEM, where start reliability at altitude may have been affected.

12.4.4 Oil consumption monitoring programme

The oil consumption monitoring programme should reflect the (S)TC holder's

A. recommendations and track oil consumption trends. The monitoring programme must be continuous and include all oil added at the departure station.

If oil analysis is recommended to the type of engine installed, it should be included in the programme.

If the APU is required for EDTO dispatch, an APU oil consumption monitoring programme should be added to the oil consumption monitoring programme.

12.4.5 Engine Condition Monitoring Programme

The engine condition monitoring programme should ensure that a one-engine-inoperative diversion may be conducted without exceeding approved engine limits (e.g. rotor speeds, exhaust gas temperature) at all approved power levels and expected environmental conditions. Engine limits established in the monitoring programme should account for the effects of additional engine loading demands (e.g. anti-icing, electrical, etc.), which may be required during the one-engine-inoperative flight phase associated with the diversion.

The engine condition monitoring programme should describe the parameters to be monitored, method of data collection and corrective action process. The programme should reflect manufacturer's instructions and industry practice. This monitoring will be used to detect deterioration at an early stage to allow for corrective action before safe operation of the aircraft is affected.

12.4.6 Verification Programme

The operator should develop a verification programme to ensure that the corrective action required to be accomplished following an engine shutdown, any EDTO significant system failure or adverse trends or any event which require a verification flight or other verification action are established. A clear description of who must initiate verification actions and the section or group responsible for the determination of what action is necessary should be identified in this verification programme. EDTO significant systems or conditions requiring verification actions should be described in the Maintenance Control Manual (MC). The AOC holder may request the support of (S)TC holder to identify when these actions are necessary. Nevertheless the AOC holder may propose alternative operational procedures to ensure system integrity. This may be based on system monitoring in the period of flight prior to entering an EDTO area.

12.5 EDTO Parts Control

The operator should develop a parts control program that ensures the proper parts and configurations are maintained for EDTO. The program should include procedures to verify that the parts installed on EDTO airplanes during parts borrowing or pooling arrangements, as well as those parts used after repair or overhaul, maintains the necessary EDTO configuration.

12.6 Maintenance Control Manual

12.6.1 The operator should develop appropriate procedures to be used by all personnel involved in the continuing airworthiness and maintenance of the aircraft, including supportive training programmes, duties, and responsibilities.

12.6.2 The operator should specify the procedures necessary to ensure the continuing airworthiness of the aircraft particularly related to EDTO operations. It should address the following subjects as applicable:

(1) General description of EDTO procedures

(2) EDTO maintenance programme development and amendment

(3) EDTO reliability programme procedures

(a) Engine/APU oil consumption monitoring

(b) Engine/APU Oil analysis

(c) Engine conditioning monitoring

(d) APU in-flight start programme

(e) Verification programme after maintenance

(f) Failures, malfunctions and defect reporting

(g) Propulsion System Monitoring/Reporting

(h) EDTO significant systems reliability

(4) Parts and configuration control programme

(5) Maintenance procedures that include procedures to preclude identical errors being applied to multiple similar elements in any EDTO significant system

(6) Interface procedures with the EDTO maintenance contractor, including the operator EDTO procedures that involve the maintenance organisation and the specific requirements of the contract

(7) Procedures to establish and control the competence of the personnel involved in the continuing airworthiness and maintenance of the EDTO fleet

12.7 Competence of Continuing Airworthiness and Maintenance Personnel

12.7.1 The EDTO Maintenance Training Program should focus on the special nature of EDTO maintenance requirements. This program should be included in the accepted maintenance training curricula. The goal of this program is to ensure that all personnel involved in EDTO are provided the necessary training so that the EDTO maintenance requirements are properly accomplished.

12.7.2 The AOC holder must ensure that the personnel involved in the continuing airworthiness management of the aircraft have knowledge of the EDTO procedures of the operator.

12.7.3 The AOC holder must ensure that maintenance personnel that are involved in EDTO maintenance tasks:

(1) Have completed an EDTO training programme reflecting the relevant approved EDTO procedures of the operator, and,

(2) Have satisfactorily performed EDTO tasks under supervision, within the framework of the Approved Maintenance Organization procedures for Personnel Authorisation.

12.8 Proposed training programme for personnel involved in the continuing airworthiness and maintenance of the EDTO fleet

12.8.1 The operator's EDTO training programme should provide initial and recurrent training for as follows:

(1) INTRODUCTION TO EDTO REGULATIONS

(a) Contents of instruction 07/DSV/2015

(b) EDTO Type Design Approval – a brief synopsis

(2) EDTO OPERATIONS APPROVAL

(a) Maximum approved diversion times and time-limited systems capability
(b) Operator's Approved Diversion Time

(c) EDTO Area and Routes

(d) EDTO MEL

(3) EDTO CONTINUING AIRWORTHINESS CONSIDERATIONS

(a) EDTO significant systems

(b) CMP and EDTO aircraft maintenance programme

(c) EDTO pre-departure service check

(d) EDTO reliability programme procedures

(i) Engine/ APU oil consumption monitoring

(ii) Engine/APU Oil analysis

(iii) Engine conditioning monitoring

(iv) APU in-flight start programme

(v) Verification programme after maintenance

(vi) Failures, malfunctions and defect reporting

(vii) Propulsion System Monitoring/Reporting

(viii) EDTO significant systems reliability

(e) Parts and configuration control programme

(f) AOC holder additional procedures for EDTO

(g) Interface procedures between AMO organisation and AOC holder organization

13. CONTINUING SURVEILLANCE

13.1 Aeroplanes with two turbine engines

13.1.1 AAC will monitor the authorised operator to ensure that the levels of reliability achieved in EDTO remain at the necessary levels and that the operation continues to be conducted safely. The fleet average in-flight shut down (IFSD) rate for the specified airframe/engine combination will continue to be monitored.

13.1.2 In the event that an acceptable level of reliability is not maintained, if significant adverse trends exist; or if significant deficiencies are detected in the type design or the conduct of the EDTO operation, AAC will:

(1) initiate a special evaluation

(2) impose operational restrictions (if necessary)

(3) stipulate corrective action for the operator to adopt in order to resolve the problems in a timely manner.

13.1.3 AAC will alert the relevant Certification Authority (i.e. the relevant NAA) when a special evaluation is initiated and provide for their participation.

João dos Reis Monteiro
President of the Board

ANNEX A – EDTO FLIGHT CREW TRAINING

The following is an example of a generic EDTO training syllabus. The syllabus should provide for initial and recurrent training for flight crew and be tailored to the operator's particular operations.

A.1 Introduction to EDTO regulations

- Brief overview of the history of EDTO
- EDTO regulations
- Definitions
- Approved one engine inoperative cruise speed
- Approved all engine operating cruise speed is applicable
- EDTO type design approval – a brief synopsis
- Maximum approved diversion times and time limited system capability
- Cargo fire suppression system capabilities and time limit if applicable
- Routes and aerodromes intended to be sued in the EDTO area of operations
- EDTO operations approval.
- EDTO area of operations
- EDTO en-route alternate aerodromes including all available approach aids
- Navigation systems accuracy, limitations and operating procedures
- Meteorological facilitates and available information
- In-flight monitoring procedures
- Computerised flight plan
- Orientation charts (including low level planning charts and flight progress charts usage including position plotting)
- Equal time point
- Critical fuel scenario.

A.2 Normal operations

- Flight planning and dispatch:
  - ⇒ EDTO fuel requirements
  - ⇒ Route alternate selection –weather minima
  - ⇒ MEL – EDTO specific
  - ⇒ EDTO service check and tech log
  - ⇒ Pre-flight flight management system set up.
- Flight performance progress monitoring:
  - ⇒ Flight management, navigation and communication systems
  - ⇒ Aeroplane system monitoring
  - ⇒ Weather monitoring
  - ⇒ In-flight fuel management (to include independent pilot cross checking of fuel quantity).

A.3 Abnormal and contingency procedures

- Diversion procedures and diversion 'decision making':
  - ⇒ Initial and recurrent training to prepare flight crew to evaluate potential significant system failures. The goal of this training should be to establish crew competency in dealing with the most probable contingencies. The decision should include the factors that may require medical, passenger related or non-technical diversions.
- Navigation and communication systems (including appropriate flight management devises in degraded modes).
- Fuel management with degraded systems.

- Initial and recurrent training which emphasises abnormal and emergency procedure to be followed in the event of foreseeable failure for each area of operation, including:
  - ⇒ procedures for single and multiple failures in flight affecting EDTO entry and diversion decisions. If standby sources of electrical power significantly degrade the cockpit instrumentation to the pilots, then training for approaches with the standby generator as the sole power source should be conducted during initial and recurrent training.
  - ⇒ operational restrictions associated with these system failures (including any applicable MEL considerations).

A.4 EDTO Line Flying Under Supervision (LFUS)

- During the introduction into service of a new EDTO type, or conversion of flight crew not previously EDTO qualified, a minimum of two EDTO sectors should be completed including a line check.
- EDTO subjects should also be included in annual refresher training.

A.5 Flight operations personnel other than flight crew

- The operator's training program in respect of EDTO should provide training (where applicable) for operations personnel other than flight crew (e.g. dispatchers) in addition to recurrent training in the following areas:
  - ⇒ EDTO regulations/operations approvals
  - ⇒ aeroplane performance/diversion procedures o area of operation
  - ⇒ fuel requirements
  - ⇒ dispatch considerations MEL, configuration deviation list, weather minima, and alternate aerodromeaerodrome
  - ⇒ documentation.

ANNEX B – EDTO ALTERNATE AERODROME

B.1 General

A. One of the distinguishing features of EDTO is the concept of an EDTO alternate aerodrome being available to which an aeroplane can divert after a single or combination of failures which require a diversion. Whereas most two-engine aeroplanes operate in an environment where there is usually a choice of diversion aerodromes available, the EDTO aeroplane may have only one alternate within a range dictated by the endurance of a particular airframe system (e.g. cargo fire suppressant), or by the approved maximum diversion time for that route.

B. It is, therefore, important that any aerodromes designated as an EDTO alternate aerodrome have the capabilities, services and facilities to safely support that particular aeroplane and that the weather conditions at the time of arrival provide a high assurance that adequate visual references are available upon arrival at decision height (DH) or minimum descent altitude (MDA) and that the surface conditions are within acceptable limits to permit the approach and landing to be safely completed with an engine and\or systems inoperative.

B.2 Adequate aerodrome

A. As with all other operations, an air operator desiring any route approval is required to show that it is able to satisfactorily conduct operations between each required aerodrome over that route or route segment. Air operators are required to show that the facilities and services specified are available for their use and adequate for the proposed operation. For the purpose of this TC, in addition to meeting these criteria, those aerodromes, which meet the AAC standards or ICAO Annex 14 and are determined to be useable by that particular aeroplane, are to be accepted as adequate aerodromes.

B.3 EDTO alternate aerodrome

A. For the purposes of this document in order for an aerodrome to be considered as an EDTO alternate aerodrome, it should have the capabilities, services and facilities necessary to be designated as an adequate aerodrome and have weather conditions and field conditions at the time of the particular operation which provide a high assurance that an approach and landing can be safely completed with an engine and/or systems inoperative, in the event that a diversion to an EDTO alternate aerodrome becomes necessary. For planning purposes only, the EDTO alternate aerodrome weather minima are higher than the weather minima required to initiate an instrument approach.

B.4 EDTO Standard en- route alternate aerodrome weather minima

A. The following are established for flight planning and release purposes with two engine aeroplanes in extended range operations. These weather minima recognize the benefits of precision approaches, as well as the increased assurance of safely completing an instrument approach at airports which are equipped with precision approaches to at least two separate runways, (two separate landing surfaces). A particular aerodrome may be considered to be a suitable aerodrome for flight planning and release purposes for extended range operations if it meets the criteria of Paragraph 3 of this ANNEX and has one of the following combinations of instrument approach capabilities and en-route alternate aerodrome weather minima (CV-CAR 8.F.260. See Table 1 below):

Table 1 - Planning minima – ETOPS

Note: The forecast weather criteria used in the selection of alternate aerodromes for IFR flight will also be used for the selection of ETOPS alternates.

Type of Approach	**Planning Minima (RVR visibility required & ceiling if applicable)**			
	Aerodrome with			
	at least 2separate approach procedures based on 2 separate aids serving 2 separate runways *(See note 1)*	at least 2 separate approach procedures based on 2 separate aids serving 1 runway	or	at least 1 approach procedure based on 1 aid serving 1 runway
Precision Approach Cat II, III (ILS, MLS)	Precision Approach Cat I Minima	Non-Precision Approach Minima		
Precision Approach Cat I (ILS, MLS)	Non-Precision Approach Minima	Circling minima or, if not available, non-precision approach minima plus 200 ft / 1 000 m		
Non-Precision Approach	The lower of non-precision approach minima plus 200 ft /1 000 m or circling minima	The higher of circling minima or non-precision approach minima plus 200 ft / 1 000 m		
Circling Approach	Circling minima			

Note 1: Runways on the same aerodrome are considered to be separate runways when they are separate landing surfaces which may overlay or cross such that if one of the runways is blocked, it will not prevent the planned type of operations on the other runway and each of the landing surfaces has a separate approach based on a separate aid.

B.5 Lower than standard enroute alternate aerodrome weather minima

A. Lower than standard en-route alternate aerodrome weather minima may be considered for approval for certain operators on a case-by-case basis by the Authority, at suitably equipped aerodromes for certain aeroplanes which have the certificated capability to safely conduct Category II and/or Category III approach and landing operations after encountering any failure condition in the airframe and/or propulsion systems which would result in a diversion to an en-route alternate aerodrome. Subsequent failures during the diversion, which would result in the loss of the capability to safely conduct and complete Category II and/or Category III approach and landing operations, should be shown to be improbable. The certificated capability of the aeroplane should be evaluated considering the approved maximum diversion time. Lower than standard en-route alternate weather minima may be considered at suitably equipped aerodromes, if appropriate, for those aeroplanes which have these approved capabilities considering the established maximum diversion time.

B.6 En-route alternate suitability in flight

A. The suitability of an en-route alternate aerodrome for an aeroplane which encounters a situation in-flight which necessitates a diversion, including the provisions of CV-CAR 8.H.155 while en-route on an extended range operation is based on a determination that the aerodrome is still suitable for the circumstances, and the weather and field conditions at that aerodrome will permit an instrument approach to be initiated and a landing completed.

ANNEX C - TYPICAL EDTO OPERATIONS MANUAL SUPPLEMENT

The EDTO operations manual can take the form of a supplement or a dedicated manual, and it could be divided under these headings as follows:

PART A. GENERAL/BASIC

a. Introduction
    (1) Brief description of EDTO (2) Definitions
b. Operations approval
    (1) Criteria
    (2) Assessment
    (3) Approved diversion time c. Training and Checking
d. Operating procedures
e. EDTO operational procedures
f. EDTO Flight Preparation and Planning
    (1) Aeroplane serviceability
    (2) EDTO Orientation charts
    (3) EDTO alternate aerodrome selection
    (4) En-route alternate weather requirements for planning
    (5) EDTO computerised Flight Plans g.
g. Flight Crew Procedures
    (1) Dispatch
    (2) Re-routing or diversion decision-making
    (3) EDTO verification (following maintenance) flight requirements
    (4) En-route Monitoring

PART B. AEROPLANE OPERATING MATTERS

This part should include type-related instructions and procedures needed for EDTO.
a. Specific type-related EDTO operations
    (1) EDTO specific limitations
    (2) Types of EDTO operations that are approved
    (3) Placards and limitations
    (4) OEI speed(s)
    (5) Identification of EDTO aeroplanes
b. Dispatch and flight planning, plus in-flight planning
    (1) Type-specific flight planning instructions for use during dispatch and post dispatch
    (2) Procedures for engine(s)-out operations, EDTO (particularly the one-engine-inoperative cruise speed and maximum distance to an adequate aerodrome should be included)
c. EDTO Fuel Planning d. Critical Fuel Scenario
e. MEL/CDL considerations
f. EDTO specific Minimum Equipment List items
g. Aeroplane Systems
    (1) Aeroplane performance data including speed schedules and power settings
    (2) Aeroplane technical differences, special equipment (e.g. satellite communications) and modifications required for EDTO

PART C. ROUTE AND AERODROME INSTRUCTIONS

This part should comprise all instructions and information needed for the area of operation, to include the following as necessary:

a. EDTO area and routes, approved area(s) of operations and associated limiting distances
b. EDTO an-route alternates
c. Meteorological facilities and availability of information for in-flight monitoring
d. Specific EDTO computerised Flight Plan information
e. Low altitude cruise information, minimum diversion altitude, minimum oxygen requirements and any additional oxygen required on specified routes if MSA restrictions apply
f. Aerodrome characteristics (landing distance available, take off distance available) and weather minima for aerodromes that are designated as possible alternates

PART D. TRAINING

This part should contain the route and aerodrome training for EDTO operations. This training should have twelve-months of validity or as required by the applicable operational requirements. Flight crew training records for EDTO should be retained for 3 years or as required by the applicable requirements.

The operator's training programme in respect to EDTO should include initial and recurrent training/checking as specified in this TC.

ANNEX D - ACCELERATED EDTO APPROVAL

A. The criteria defined in this section permit approval of EDTO operations up to 180 minutes, when the operator has established that those processes necessary for successful EDTO are in place and are proven to be reliable. The basis of the accelerated approval is that the operator will meet equivalent levels of safety and satisfy the objectives of this AMC.

B. The Accelerated EDTO approval process includes the following phases:

(1) Application phase
(2) Validation of the operator's EDTO processes
(3) Validation of Operator EDTO Continuing Airworthiness and Operations Capability
(4) Issue of EDTO Operations Approval by the competent authority

D.1 Application phase

A. The operator should submit an Accelerated EDTO Operations Approval Plan to the Authority six (6) months before the proposed start of EDTO. This time will permit the competent authority to review the documented plans and ensure adequate EDTO processes are in place.

(1) Accelerated EDTO Operations approval plan:

The Accelerated EDTO Operations approval plan should define:

- the proposed routes and the EDTO diversion time necessary to support those routes;
- The proposed one-engine-inoperative cruise speed, which may be area specific depending upon anticipated aeroplane loading and likely fuel penalties associated with the planned procedures;
- How to comply with the EDTO Processes listed in paragraph (2);
- The resources allocated to each EDTO process to initiate and sustain EDTO operations in a manner that demonstrates commitment by management and all personnel involved in EDTO continuing airworthiness and operational support;
- How to establish compliance with the build standard required for Type Design Approval, e.g. CMP document compliance;
- Review Gates: A review gate is a milestone of the tracking plan to allow for the orderly tracking and documentation of specific provisions of this section. Normally, the review gate process will start six months before the proposed start of EDTO and should continue until at least six months after the start of EDTO. The review gate process will help ensure that the proven processes comply with the provisions of this AMC and are capable of continued EDTO operations.

(2) Operator EDTO process elements

The operator seeking Accelerated EDTO Operations Approval should also demonstrate to the competent authority that it has established an EDTO process that includes the following EDTO elements:

- Airframe/engine combination and engine compliance to EDTO Type Design Build Standard (CMP);
- Compliance with the continuing airworthiness requirements as defined in section 12, which should include:

a. A Maintenance Programme;

b. a proven EDTO Reliability Programme;
c. A proven Oil Consumption Monitoring Programme;
d. A proven Engine Condition Monitoring and Reporting system;
e. A propulsion system monitoring programme;
f. An EDTO parts control programme
g. A proven plan for resolution of aeroplane discrepancies.

- EDTO operations manual supplement or its equivalent in the Operations Manual;
- The operator should establish a programme that results in a high degree of confidence that the propulsion system reliability appropriate to the EDTO diversion time would be maintained;
- Initial and recurrent training and qualification programmes in place for EDTO related personnel, including flight crew and all other operations personnel;
- Compliance with the Flight Operations Programme as defined in this TC;
- Proven flight planning and dispatch programmes appropriate to EDTO;
- Procedures to ensure the availability of meteorological information and MEL appropriate to EDTO; and
- Flight crew and dispatch personnel familiar with the EDTO routes to be flown; in particular the requirements for, and selection of EDTO en-route alternate aerodromes.

(3) Process elements Documentation:

Documentation should be provided for the following elements:

- Technology new to the operator and significant differences in EDTO significant systems (engines, electrical, hydraulic and pneumatic), compared to the aeroplanes currently operated and the aeroplane for which the operator is seeking Accelerated EDTO Operations Approval;
- The plan to train the flight and continuing airworthiness personnel to the different EDTO process elements;
- The plan to use proven or manufacturer validated Training and Maintenance and Operations Manual procedures relevant to EDTO for the aeroplane for which the operator is seeking Accelerated EDTO Operations Approval;
- Changes to any previously proven or manufacturer validated Training, Maintenance or Operations Manual procedures described above. Depending on the nature of any changes, the operator may be required to provide a plan for validating such changes;
- The validation plan for any additional operator unique training and procedures relevant to EDTO, if any;
- Details of any EDTO support programme from the airframe/engine combination or engine (S)TC holder, other operators or any third country authority or other competent authority; and
- The control procedures when a contracted maintenance organisation or flight dispatch organisation is used.

D.2 Validation of the Operator's EDTO Processes

A. This section identifies process elements that need to be validated and approved prior to the start of Accelerated EDTO. For a process to be considered proven, the process should first be described, including a flow chart of process elements. The roles and responsibilities of the personnel managing the process should be defined including any training requirement. The operator should demonstrate that the process is in place and functions as intended. This may be accomplished by providing data, documentation and analysis results and/or by demonstrating in practise that the process works and consistently provides the intended results. The operator should also demonstrate that a feedback loop exists to facilitate the surveillance of the process, based on in-service experience.

B. If any operator is currently approved for conducting EDTO with a different engine and/or airframe/engine combination, it may be able to document proven EDTO processes. In this case only minimal further validation may be necessary. It will be necessary to demonstrate that processes are in place to assure equivalent results on the engine and/or airframe/engine combination being proposed for Accelerated EDTO Operations Approval.

(1) Reduction in the validation requirements:

The following elements will be useful or beneficial in justifying a reduction by the competent authority in the validation requirements of EDTO processes:

- Experience with other airframes and/or engines;
- Previous EDTO experience;
- Experience with long range, over-water operations with two, three or four engine aeroplanes;
- Any experience gained by flight crews, continuing airworthiness personnel and flight dispatch personnel, while working with other EDTO approved operators, particularly when such experience is with the same airframe or airframe/engine combination.

Process validation may be done on the airframe/engine combination, which will be used in Accelerated EDTO operation or on a different aeroplane type than that for which approval is being sought.

(2) Validation programme:

A process could be validated by demonstrating that it produces equivalent results on a different aeroplane type or airframe/engine combination. In this case, the validation programme should address the following:

- The operator should show that the EDTO validation programme can be executed in a safe manner;
- The operator should state in its application any policy guidance to personnel involved in the EDTO process validation programme. Such guidance should clearly state that EDTO process validation exercises should not be allowed to adversely impact the safety of actual operations, especially during periods of abnormal, emergency, or high cockpit workload operations. It should emphasise that during periods of abnormal or emergency operation or high cockpit workload EDTO process validation exercises may be terminated;
- The validation scenario should be of sufficient frequency and operational exposure to validate maintenance and operational support systems not validated by other means;
- A means should be established to monitor and report performance with respect to accomplishment of tasks associated with EDTO process elements. Any recommended changes resulting from the validation programme to EDTO continuing airworthiness and/or operational process elements should be defined.

(3) Documentation requirements for the process validation

The operator should:

- Document how each element of the EDTO process was utilised during the validation;
- Document any shortcomings with the process elements and measures in place to correct such shortcomings;
- Document any changes to EDTO processes, which were required after an in- flight shut down (IFSD), unscheduled engine removals, or any other significant operational events;

- Provide periodic Process Validation reports to the competent authority (this may be addressed during Review Gates).

(4) Validation programme information

Prior to the start of the validation process, the following information should be submitted to the competent authority:

- Validation periods, including start dates and proposed completion dates;
- Definition of aeroplane to be used in the validation (List should include registration numbers, manufacturer and serial number and model of the airframe and engines);
- Description of the areas of operation (if relevant to validation) proposed for validation and actual operations;
- Definition of designated EDTO validation routes. The routes should be of duration required to ensure necessary process validation occurs;
- Process validation reporting. The operator should compile results of EDTO process validation.

D.3 Validation of Operator EDTO Continuing Airworthiness and Operations Capability

A. The operator should demonstrate competence to safely conduct and adequately support the intended operation. Prior to EDTO approval, the operator should demonstrate that the EDTO continuing airworthiness processes are being properly conducted.

B. The operator should also demonstrate that EDTO flight dispatch and release practices, policies, and procedures are established for operations.

C. An operational validation flight may be required so that the operator can demonstrate dispatch and normal in-flight procedures. The content of this validation flight will be determined by the Competent Authority based on the previous experience of the operator.

D. Upon successful completion of the validation flight, when required, the operator should modify the operational manuals to include approval for EDTO as applicable

D.4 EDTO Operations Approval issued by the Competent Authority

A. Operations approvals granted with reduced in-service experience may be limited to those areas determined by the competent authority at time of issue. An application for a change is required for new areas to be added.

B. The approval issued by the Competent Authority for EDTO up to 180 minutes should be based on the information required in section 11 of this TC.

ANNEX E- APPLICATION FOR EXTENDED DIVERSION OPERATIONS (EDTO) APPROVAL

AAC AGÊNCIA DE AVIAÇÃO CIVIL	**APPLICATION FOR EXTENDED DIVERSION OPERATIONS (EDTO) APPROVAL**	Reference:	FS.DSV.012
		Revision:	Revision 1
		Date:	21-07-2015

Applicability: EDTO Operations in accordance with Instrução Nº 07DSV2015 Extended Diversion Time Operations (EDTO) Approval.

Completion of form: Please complete those fields that are relevant to your aircraft and operations.

Each relevant box should be completed with a tick (v) or a (x). Items marked with an asterisk (*) to be completed only for first aeroplane of each aeroplane type / model in operator's fleet. Where form must be completed by referring to a document of applicant's documentation of system, add manual reference chapter and sub-chapter. Please ensure all applicable areas are completed.

Application Accuracy of information provided. All information will be used to assess EDTO compliance. An incomplete, poorly prepared or inaccurate application may:

- Result in rejection of the application
- Result in delays
- Add to the cost of the assessment
- Result in a refusal to issue the approval

Note: It is an offence to make a false declaration in this form.

Applications for EDTO approval shall be made using AAC Form FS.DSV.12. Submit the form and application package referenced in paragraph 4 of EDTO application Form FS.DSV.12 to:

Agencia de Aviação Civil (AAC)
Av. Cidade de Lisboa, Nº 34 – Várzea
C.P. 371 – Praia, Cabo Verde

1. GENERAL		
General information		
1. Applicant:		
2. Aeroplane Registration:		
3. Aeroplane Manufacturer:		
4. Aeroplane Type Designation / Model Designation:		
5. Aeroplane Serial No:		
6. Engine Manufacturer:		
7. Engine Type Designation / Model Designation:		
8. APU Manufacturer:		
9. APU Type Designation:		
Scope of application	**14. Yes**	**15. No**
10. Application for EDTO 75 minutes ?	□	□
11. Application for EDTO 120 minutes ?	□	□
12. Application for EDTO 180 minutes ?	□	□
13. Initial request for EDTO approval for aeroplane type/model reference in 1.4?	□	□
14. Application for accelerated EDTO?	□	□
15. Application is based on CMP Document Nr: Revision number: _____ Revision date: _____/_____/_____		

2. AIRWORTHINESS

Type Design Approval for referenced Aeroplane Type Designation
1. The EDTO type design approval is reflected in : □ AFM □ AFM Supplements □ Type Certification Data Sheet □ Supplemental Type Certificate □ Other:

2**.** The Airplane Flight Manual / Supplement shows following airworthiness approval for EDTO systems installation**:** EDTO _____ minutes		
Eligibility for referenced Aeroplane Serial Number	**Yes**	1 No
3**.** Do you comply with the title and numbers of all modifications, addition and changes which were made in order to substantial the incorporation of the CMP standard in the aeroplane?	☐	☐
4. CMP Compliance list established?	☐	☐

Applicant's Experience and Propulsion System Reliability (*)		
5. Number of month/years of operational experience with specific engine/airframe combination Experience:		
6. Total number of long range and/or domestic operations conducted with specific engine/airframe combination: Number of domestic legs: Number of long range legs		
7. Total number of engine/airframe hours and with cycles specific engine/ airframe combination: Total operator's airframe fleet hours: Total operator's airframe fleet cycles: Total operator's engine hours: Hours of operator's high time engine:		
8. In flight shutdown (FSD) rate (all causes), including the 12 month rolling average for both operator and the word fleet (IFSD per 1,000 engine flight hours). IFSD rate of operator's fleet: IFSD RATE of world fleet:		
9.Unscheduled engine removal rate (URR) for both operator and the world fleet (URR) rate per 1,000 engine flight hours): URR of operator's fleet: URR of world fleet:		
10.Records of mean time between failures (MTBF) for major components available? (unit flight hours / number of unit failure)	Yes ☐	**No** ☐
11. Records of APU start and run reliability available?	☐	☐
12.Records of delays and cancellations, with the causes, by specific aeroplane systems, available?	☐	☐
13.Records of the following significant operator events available? (including the phase of flight where the event occurred):		
Uncommented power changes ? (surge or rollback)	☐	☐
Inability to control engine or obtain desired power ?	☐	☐
In flight shutdown events ?	☐	☐

Supplement to the Maintenance Program and Maintenance Procedures (*)	
The applicant is required to establish the following procedures:	To be completed by applicant The procedures are described in (add manual reference, chapter and sub-chapter, e.g. MME 16.4.1)
14. Procedures to preclude simultaneous actions from being applied to multiple similar elements in any EDTO critical system.	
15. Procedures describing the involvement of centralized maintenance control over EDTO related tasks.	
16. EDTO pre-departure service check for verifying the status of the aeroplane and ensuring that certain critical items are acceptable.	

17. Procedures for reviewing and documenting of log books to ensure proper MEL procedures, deferred items and maintenance checks and that system verification procedures have been property performed.	
EDTO Manual (+) The applicant should develop a manual for use by personnel involved in EDTO. The purpose of the EDTO Manual is to identify the supplementary procedures and requirements for EDTO operations. This manual should contain the following procedures**:**	
Engine/APU Oil Consumption Monitoring Program	
17. Procedures that monitor oil consumption rates for engines and APU for EDTO and non-EDTO flights.	
18. Procedures for calculating oil consumption rate prior to departure to address any sudden shift in consumption	
19. Procedures for monitoring of long term data for increasing trends.	
Engine Condition Monitoring Program	
20. Procedures for detecting deterioration of engines at an early stage to allow for corrective action before safe operation is affected.	
21. Parameters to be monitored, method of data collection and corrective action process.	
22. Procedures for engine limit margin monitoring to ensure that a prolonged single-engine diversion may be conducted without exceeding proved engine limits	
Verification Program after Maintenance	
23. List of primary systems critical to EDTO	
24. Conditions that require verification flights.	
25. Procedures for initiating verification actions.	
26. Procedures that ensure corrective action are taken after engine shut-down and any other significant failure	
27. Procedures that identify and reverse adverse trends	
28. Procedures that preclude repeat items from occurring.	
29. Procedures that monitor and evaluate corrective actions.	
30. Procedures that preclude simultaneous actions from being applied to multiple similar elements in any EDTO-critical system.	
Reliability Program	
31. Events-oriented program for EDTO, in addition to the normal reliability program, to allow early identification and prevention of EDTO problems.	

32. Procedures to ensure reporting of significant individual events (in-flight-shut-downs, flight diversions or turn-back, un-commanded power changes or surges inability to control the engine or obtain desired power, problems with systems critical to EDTO and any other event detrimental to EDTO.	
33. Reporting criteria for the reporting to the Authority of events reportable thought this program.	
34. Procedures for down-grade/up-grade criteria (diversion time).	
35. Procedures for monitoring of APU high altitude in-flight start and run capability.	
Propulsion System Monitoring Program	
36. Procedures for the monitoring of propulsion system in flight shutdown (IFSD) rate, evaluation of sustained trends and corrective actions.	
37. Procedures for the monitoring of long tem IFSD trends (12 month moving average).	
38. Reporting criteria for the assessment of propulsion system reliability and monthly reporting to the Authority of results of operator's assessment.	
Maintenance Training Program	
39. Training programs to ensure each person, including contact personnel, involved in EDTO is adequately trained on operator's EDTO procedures and is competent to perform his/her duties (EDTO awareness training).	
40. Procedures for ensuring that maintenance personnel have completed EDTO awareness training and have satisfactorily performed EDTO maintenance tasks under supervision, within the framework of the CV CAR Part 6 approved procedures for personnel Authorisation.	
Parts Control Program	
41. Procedures that ensure that proper EDTO parts are used and EDTO configuration is maintained.	
42. Control procedures for parts pooling and borrowing.	

3. OPERATION	
Operating Practices and Procedures (*)	
The applicant must institute EDTO Operating Practices and Procedures. These practices and procedures should cover the following subjects:	To be completed by applicant EDTO Operating Practices and procedures are described in (add manual reference, chapter and sub-chapter).
1. Flight planning procedures (EDTO) status of aeroplane, review of technical log, use of minimum equipment list (Mel), external inspection, etc).	

2. En-route procedures (cross checking procedures to identity navigation errors, selection of other navigation aids in case of loss of RNAV capability, use of INS/IRS navigation systems without automatic radio navigation updating, use of GPS, notification of ATC of navigation equipment problems, contingency procedures, etc,), minimum equipment at the EDTO entry point, alternate routings, position check before entering EDTO airspace, alternate airports, performance data, fuel and oil supply etc.	
3.Fuel and oil supply for EDTO operations.	
4. Procedures with respect to flight crew response to abnormal situations (response to non-normal vents, etc,.	
5. Post-flight procedures (technical log entries, defects description, etc.).	
Flight Crew Training and Qualification (*)	
The applicant is required to establish the following(covering subjects under 3.1. to 3.5).	To be completed by applicant Description in (add manual reference, chapter and sub-chapter.
6. Flight crew qualification requirements.	
7. Description of initial and recurrent training, checking and training-syllabi	

4. APPLICATION PACKAGE

Documentation to be submitted to the Authority	**Submitted**?	
	Yes	**No**
1.Compliance statement which shows how the criteria of CT-30-001 have been satisfied (*).	□	□
2. CMP Document (latest revision) (*)	□	□
3-Section of the AFM or AFM supplements that document EDTO airworthiness approval.	□	□
4. CMP compliance list showing compliance with the titles and numbers of all modification, additions and changes which were made in order to substantial the incorporation of the CMP standard in the aeroplane.	□	□
5. EDTO Manual (*)	□	□
6. Supplements and revision to the existing Maintenance Program and Maintenance Procedures Manual(*)	□	□
7. Flight crew EDTO training programmes and syllabi for initial and recurrent training (*).	□	□
8. Operation manuals and checklists that include EDTO operating practices and procedures (GOM, Airport Analysis, TM, AOM, FCOM, Route Manuals, stand alone EDTO manuals, etç .	□	□
9. Minimum Equipment List (MEL) that include items pertinent to EDTO operations (*)	□	□

5. APLLICANT'S STATEMENT

The undersigned certifies the above information to be correct and that aeroplane system installation, continuing airworthiness of systems, minimum equipment for dispatch, operating and flight crew training comply with the requirements of CT-30-001

Name of Post Holder Maintenance:	**Signature:**	**Date:**

Name of Post Holder Operations:	**Signature:**	**Date:**
Name of Quality Manager Maintenance	**Signature:**	**Date:**
Name of Quality Manager Operations	**Signature:**	**Date:**

(For official use only)

Subject	**Responsible**	**Date**	**SRS Nº**	**Signature**
1. AAC Form FS.DSV.12 Application and item 4 application package checked for completeness.	PMI/POI			
2. Airworthiness Approval granted (Letter of Approval)	PMI			
3. Operational Approval granted (AOC or Letter of Approval)	POI			
4. EDTO Approval process administratively completed (Ops Specs update, Billing).	Director FS		**NA**	
EDTO Approved □ Yes □ No				
Withdrawal of EDTO Approval Reason: Name: Date: Signature				