

AW/OPS 1.1.054	 CAAI	OPS Inspector Handbook
Extended Diversion Time Operations		Revision 3
		02 Mar 14

1. Objective

- 1.1. This Directive contains guidance for Inspectors for use when approving EDTO operations for an operator.
- 1.2. The purpose of the Extended Diversion Time Operations (EDTO) directive is:
 - 1.2.1. To assist CAAI with a view to ensuring that application submitted to the CAAI for EDTO approval are standardized and include all items that are required by CAAI ANR.Ops and by other additional CAAI required items (AP 1.1.054, F 1.1.054-1,etc). This Directive, when completed, should be submitted with the supporting program or reference made to appropriate documents.
 - 1.2.2. To substantiate by a statement that the type design reliability and the Performance of the proposed aeroplane/engine combination have been evaluated (per AP 1.1.054 and the guidance in the FAA Advisory Circular 120-42, Extended-Range Operation Airplanes as amended) and found suitable for extended range operations.
- 1.3. The approval process for EDTO follows the standard 5-phase process of approval.
- 1.4. This is a common directive for Airworthiness and Operation
 - 1.4.1. Close coordination between AW and OPS inspectors executing this directive is required.
 - 1.4.2. The OI will be the lead inspector in executing this directive.
 - 1.4.3. Any amendments to this directive must be made to both AW Inspector Handbook and OPS Inspector Handbook

2. General

- 2.1. EDTO may be referred to as ETOPS in this and related documents.
- 2.2. The standards that the CAAI has adopted for approving EDTO are based on FAA Advisory Circular (AC) 120-42 (As amended). AP 1.1.054 specifies this method of adaptation of standards and serves as a cross reference between FARs, ANRs and terms used.
- 2.3. FAA Advisory Circular (AC) 120-42, Extended Range Operation (ETOPS), requires that for each ETOPS flight the airport

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selected for use as an en route alternate have RFFS. Section 4.1 establishes the guidelines and procedures for determining the minimum acceptable RFFS capability for those airports that are designated for use as adequate ETOPS en route alternates.

- 2.4. FAA AC 120-42, Extended Range Operation (ETOPS) , provides guidance for EDTO operational approval. This approval includes procedures for the resolution of certain airplane/engine discrepancies through the requirement of verification flights. These flights are an attempt to identify potential human factor or mechanical errors prior to EDTO operation. EDTO operators should have verification flight procedures described in their supplemental maintenance program for events involving propulsion system shutdown, engine or major engine module change, primary system failure, and for certain adverse trends or prescribed events. In the case of an engine change or a major engine module change, the requirement of a verification flight is in addition to the normal test cell and ground run procedures. Section 4.2 discusses the requirements for such verification flights.
- 2.5. Section 4.3 contains information and guidance on a program that allows extended diversion time operations (EDTO) air carriers to reduce the amount of fuel reserve that is required for the specific purpose of compensating for drag associated with the accumulation of ice on the wing and fuselage. A reduction in planned fuel is allowed when no icing conditions exist for that flight.
- 2.5.1. FAA Advisory Circular (AC) 120-42, Extended Range Operations (ETOPS), set forth policy and the procedures for determining the suitability of a specific airframe/engine combination for EDTO, as well as operational approval for EDTO. A specific airframe/engine combination must demonstrate substantial service experience during which essential airframe and propulsion systems achieve an acceptable level of reliability. EDTO considerations also include requirements that the high level of reliability of essential airframe and propulsion equipment will be ensured by the operator's maintenance program. The provisions of AC 120-42, stipulate that an Auxiliary Power Unit (APU) in-flight start/run reliability be substantiated in order to ensure adequate reliability for EDTO. EDTO operators shall use an initial APU in-flight start/run program to substantiate their ability to maintain inherent APU in-flight start reliability levels for each airframe and engine combination. Section 4.4 includes guidance on APU data collection for EDTO.

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3. Reference Material, Forms & Job-Aids

3.1. Reference Material

- 3.1.1. AP 1.1.054
- 3.1.2. F 1.1.054-1 EDTO checklist - OPS.
- 3.1.3. F 1.1.054-2 EDTO checklist - AW.
- 3.1.4. FAA Advisory Circular (AC) 120-42(As amended)
Extended Range Operation (ETOPS)
- 3.1.5. AW/OPS 1.1.030 – The General Process for Approval or Acceptance
- 3.1.6. INR Ops. 356, 403, 411, 413, 418, 418A, 418B, 462, 484, 505, 511, 511A, 511B, 517, 522, 524A, 537, Att. 4, Att. 5, Att. 6.
- 3.1.7. Various WTS codes are used in this process, such as Training program approval, Manual review etc. The inspector should select the appropriate codes as necessary.
- 3.1.8. Schedule ETOPS surveillance. The EDTO checklists F 1.1.054-1 and F 1.1.054-2 can be used as a guide in performing surveillance on EDTO approved operators.

4. Process

- 4.1. Requests for EDTO operations should be made in accordance with the 5-phase approach for approvals.
 - 4.1.1. A separate application, and approval for each aircraft make/model/series and engine combination must be made.
 - 4.1.2. 1.1.054-1 and F 1.1.054-2 – EDTO checklists can be used by relevant inspectors as a guide to the contents of the application and as a job-aid in the review process. The checklists can be used in surveillance activities as well.
- 4.2.
- 4.3. **LEVEL OF RESCUE AND FIRE FIGHTING SERVICES (RFFS) FOR ETOPS EN ROUTE ALTERNATES.**
FAA Advisory Circular (AC) 120-42, Extended Range Operation (ETOPS), requires that for each ETOPS flight the airport selected for use as an en route alternate have RFFS. This

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paragraph establishes the guidelines and procedures for determining the minimum acceptable RFFS capability for those airports that are designated for use as an enroute alternates (for EDTO).

- 4.3.1. **EDTO Flights.** For EDTO flights, the minimum acceptable standard of RFFS, for an adequate airport for use as an en route alternate, is ICAO RFFS Category 4. This minimum standard applies to most geographical areas (such as Canada) where the flightcrew can select the most appropriate airport for the encountered flight situation. In all cases the operator must ensure that the flightcrews are provided current information concerning the RFFS capability for those airports that can be considered as adequate for ETOPS en route alternate use.

- 4.3.2. **Remote Airports.** For those remote airports that have reduced or eliminated onsite RFFS capability, the CAAI will allow the use of municipal fire departments located off-airport so that the minimum stated RFFS standard can be met. Offsite equipment and personnel from municipal fire departments must be able to respond to the airport within 30 minutes from notification. A 30 minute response time is deemed adequate to meet ETOPS requirements, where the airplane may be hours away from landing. The ability to use offsite RFFS heightens the need for the flightcrew to communicate to Air Traffic Control (ATC) and company their intent to divert to a specified airport so that the required response can be activated.

- 4.3.3. **Suggested RFFS.**
This material with suggested RFFS capabilities has been coordinated with the European Aviation Safety Agency (EASA) EDTO Work Group. EASA has adopted these guidelines for RFFS capability at EDTO enroute alternate airports, and Joint Aviation Requirements Operations 1 (JAR-OPS 1) will be amended accordingly.

- 4.3.4. **Provide Information.**
Principal inspectors are requested to provide this information to those air carriers that are authorized to conduct EDTO. Air carriers are required to determine that the minimum acceptable RFFS level stated above is met prior to designating the airport as an adequate EDTO en route alternate.

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4.4. ENGINE CHANGE AND VERIFICATION FLIGHTS FOR ETOPS AIRPLANES—GUIDANCE FOR EDTO OPERATORS.

4.4.1. Guidance.

FAA AC 120-42, Extended Range Operation, provides guidance for EDTO operational approval. This approval includes procedures for the resolution of certain airplane/engine discrepancies through the requirement of verification flights. These flights are an attempt to identify potential human factor or mechanical errors prior to EDTO operation. EDTO operators should have verification flight procedures described in their supplemental maintenance program for events involving propulsion system shutdown, engine or major engine module change, primary system failure, and for certain adverse trends or prescribed events. In the case of an engine change or a major engine module change, the requirement of a verification flight is in addition to the normal test cell and ground run procedures.

4.4.2. **Extended Range Operation.** As defined in FAA AC 120-42, extended range operation commences at a point on the outbound route that is one hour flying time (in still air, at normal cruising speed with one engine inoperative) from the nearest airport. It is permissible to designate the period of time from airport departure to entry into the EDTO environment as a maintenance verification flight, in combination with a regularly scheduled EDTO revenue flight, provided the verification phase is documented as satisfactorily completed upon reaching the EDTO entry point.

4.4.3. **Type of EDTO** It is important to note that when this type of EDTO verification flight is conducted, written procedures must be in place to ensure the flightcrew is fully briefed prior to dispatch concerning the event and/or the maintenance performed that necessitates the verification flight. Appropriate maintenance personnel should convey to the flightcrew the specific observations and/or actions required of them during the verification portion of the flight as well as the method to be used to properly record the satisfactory completion of that verification flight. All flightcrew observations and/or actions must be completed upon entering the EDTO portion of the flight. The functions and the role of the centralized maintenance control department are important and should be clearly defined in the operator's EDTO manual, particularly the responsibilities pertaining to propulsion system shutdowns, engine changes, primary system failures, verification flights, and certain adverse trends or other prescribed events.

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4.5. RELIEF OF ICING FUEL PENALTIES ASSOCIATED WITH CRITICAL FUEL CALCULATIONS FOR ETOPS.

This paragraph contains information and guidance on a program that allows extended-range operation (ETOPS) air carriers to reduce the amount of fuel reserve that is required for the specific purpose of compensating for drag associated with the accumulation of ice on the wing and fuselage. A reduction in planned fuel is allowed when no icing conditions exist for that flight. This bulletin sets forth the criteria and eligibility requirements for air carriers holding authorization to conduct EDTO that wish to participate.

4.5.1. Background.

4.5.1.1 FAA Advisory Circular (AC) 120-42 (latest edition) requires that for each EDTO flight, the air carrier must calculate the critical fuel requirements based on the maximum diversion time, and incorporate those requirements in the minimum fuel load. The basic premise in determining the critical fuel required is that a flight encounters icing conditions for the entire diversion, including the approach and landing. The airplane manufacturers provide approved data for fuel burn in icing conditions to account for increased wing and fuselage ice drag, and for the use of airplane anti-ice and deice systems. This data is factored into the critical fuel calculation.

4.5.1.2 Increased knowledge of accrual of inflight icing and advanced meteorological techniques used to forecast icing conditions challenges the premise that assumes every EDTO diversion encounters icing conditions, and that the icing will remain in effect for the entire diversion.

4.5.2. Discussion.

Relief of icing fuel penalties associated with critical fuel calculations for EDTO will be applied in accordance with this bulletin. Detailed guidelines and procedures to be used in determining icing locations in remote areas associated with EDTO diversions were developed by the FAA Flight Standards Service, industry and FAA meteorologists. The procedures for this program are attached as an appendix, titled Program for Relief of Icing Fuel Penalties Associated With Critical Fuel Calculations for EDTO. The attachment contains the eligibility requirements that EDTO air carriers must meet in order to participate in the program.

4.5.3. Principal Operations Inspector (POI) Responsibilities.

POIs approving EDTO air carriers to participate in this program shall use the following procedures:

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4.5.3.1 Determine eligibility of EDTO air carrier to participate in the program (i.e., hold authority to conduct 180-minute EDTO)

4.5.3.2 Determine that the air carrier possesses the required meteorological data (company or contract source) to meet the program criteria and conditions.

4.5.3.3 The POI will authorize the air carrier to participate in the program via amendment to the operations specifications (Operation Specification part in OM A). The authorization should be reflected in a note added to operations specifications area of operation (e.g., Authorized to apply program for Relief of Icing Fuel Penalties Associated with Critical Fuel Calculations for EDTO operations).

4.6. **AUXILIARY POWER UNIT (APU) DATA COLLECTION FOR EDTO.**

This paragraph provides guidance to PMIs and POIs, having certificate responsibility for Israeli operators with approval for EDTO.

4.6.1. **Background.**

FAA Advisory Circular (AC) 120-42, Extended Range Operations (ETOPS), set forth policy and the procedures for determining the suitability of a specific airframe/engine combination for EDTO, as well as operational approval for EDTO. A specific airframe/engine combination must demonstrate substantial service experience during which essential airframe and propulsion systems achieve an acceptable level of reliability. EDTO considerations also include requirements that the high level of reliability of essential airframe and propulsion equipment will be ensured by the operator's maintenance program. The provisions of AC 120-42, stipulate that an Auxiliary Power Unit (APU) in-flight start/run reliability be substantiated in order to ensure adequate reliability for EDTO. EDTO operators shall use an initial APU in-flight start/run program to substantiate their ability to maintain inherent APU in-flight start reliability levels for each airframe and engine combination.

4.6.2. **Validation Program Procedures.**

The following criteria shall 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:

4.6.2.1 APU in-flight starts should be made on flights of 4 hours or more, subject to the following conditions:

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- 4.6.2.2 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 and maintenance procedures (CMP) document, in order for credit to be allowed.
- 4.6.2.3 If in-flight APU starts are performed on an EDTO flight, the start should be attempted on the return leg .
- 4.6.2.4 The start attempt should be initiated before top of descent, or at such time that will ensure a two-hour cold soak at altitude.
- 4.6.2.5 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.
- 4.6.2.6 A continuation of the initial in-flight start validation program may be required, if less than 95 percent of in-flight start reliability is achieved in coordination with the PMI.
- 4.6.2.7 APU in-flight starts should be performed on a routine basis as described in subparagraph B3 immediately following, during the first 6 months of each new EDTO approval to achieve and sustain inherent reliability.
- 4.6.2.8 During the initial validation period, 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 CAAI. All APU in-flight start failures, occurring during actual EDTO operations, should be reported within 72 hours in accordance with FAA AC 120-42, appendix 4. The report should include corrective actions taken as well as the status of corrective action programs, fleet upgrades, etc.

4.6.3. **Policy.**

At the successful completion of the operators' APU program validation, each operator is to establish a monitoring program acceptable to the CAAI to ensure that the APU will continue at a level of performance and reliability established by the manufacturer or CAAI. Operators with existing approved programs may continue on their current program. This monitoring program should include periodic sampling of APU in-flight starting. This sampling interval may be adjusted according to system performance. PMIs shall periodically review APU in-flight start programs to ensure system reliability and recommend adjustments where necessary.

5. Task Outcomes

- 5.1. ETOPS approval is given in the OpSpecs.