CHAPTER 34

EVALUATE EXTENDED DIVERSION TIME OPERATIONS (EDTO)

0.0 LIST OF EFFECTIVE PAGES

CHAPTER THIRTY FOUR	PAGE	EFFECTIVE DATE
	1 OF 13	4th Sept., 2023
	2 OF 13	4th Sept., 2023
	3 OF 13	4th Sept., 2023
	4 OF 13	4th Sept., 2023
	5 OF 13	4th Sept., 2023
	6 OF 13	4th Sept., 2023
	6 OF 13	4th Sept., 2023
	7 OF 13	4th Sept., 2023
	8 OF 13	4th Sept., 2023
	9 OF 13	4th Sept., 2023
	10 OF 13	4th Sept., 2023
	11 OF 13	4th Sept., 2023
	12 OF 13	4th Sept., 2023
	13 OF 13	4th Sept., 2023

1.0 OBJECTIVE

This section describes the process of evaluating an operator for a deviation under the Nig. CARs for extended diversion time operations.
References: ICAO Annex 6, Part I, Attachment E, ICAO Document 9642 - AN/941, Part III, Chapter I and Nig. CARs Part 8.6.2.11

GENERAL

A. Definition:
Extended Diversion Time Operations (EDTO): 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.

B. In requesting EDTO approval, each AOC holder shall show to the satisfaction of the Authority that:

(i) For all aeroplanes:

(A) The most limiting EDTO significant system time limitation, if any, indicated in the Aircraft Flight Manual (directly or by reference) and relevant to that particular operation is not exceeded, and
(B) The additional fuel required by 8.6.2.15 of this part shall include the fuel necessary to comply with the EDTO critical fuel scenario as established by the Authority.

(ii) For aeroplanes with two turbine engines, the aeroplane is EDTO certified and the Authority has verified the:

(a) Maturity and reliability of the propulsion system;

i) For EDTO of 180 minutes or less, the reliability target of the propulsion system should be such that the risk of catastrophic loss of thrust from independent causes is extremely remote; and

ii) For EDTO of greater than 180 minutes, the reliability target of the propulsion system should be such that the risk of catastrophic loss of thrust from independent causes is extremely improbable.

(b) Airworthiness certification for EDTO of the aeroplane type;

(c) EDTO maintenance programme including necessary maintenance requirements; and

(d) Maintenance control manual or EDTO manual.

C. An EDTO authorization requires an approval from the Director, Airworthiness Standards and Director, Operations and Training for a deviation to the operating rules, To meet

the requirements of this deviation the operator must be able to:

(1) Substantiate that the type design reliability and the performance of the proposed aeroplane/engine combination have been evaluated per the guidance IN Advisory Circular NCAA-AC-AWS015, Extended-Range Operation with Two-EngineAirplanes as amended, and found suitable for extended range operations.

(2) Submit an application package that includes supplemental maintenance requirements and programmes that allow for safe operations under an EDTO authorization.

D. Application Package. The application package must include the following programmes:

(1) Supplemental maintenance programme. This programme must include the basic maintenance programme with additional EDTO requirements for the aeroplane being considered. These requirements should include maintenance procedures that prevent actions such as changing oil filters, chip detectors, fuel controls, etc., from being done simultaneously on both engines.

(2) Verification programme. This programme must have procedures that would preclude an aeroplane from being dispatched for extended range operation unless appropriate corrective actions have been taken and verified, after any of the following:

- A propulsion system shutdown
- A primary system failure
- Any significant adverse trends/repeat problems from a previous flight

(3) Airframe/Engine condition monitoring programme. Condition monitoring should provide a system for a data collection that ensures the timely analysis and correction of engine problems. This programme should accomplish the following:

- Prevent in-flight shutdowns of power plant systems through detection of early stage deterioration
- Ensure that engine limit margins are maintained so that a prolonged single-engine diversion may be conducted without exceeding approved engine limits (i.e., rotor speeds, exhaust gas temperature, etc.,) at all approved power levels and expected environmental conditions.

(4) Reliability programme. This must be an event-oriented reliability programme designed primarily to identify and prevent problems. This programme must incorporate reporting criteria for use by the operator and the NCAA as a measure of extended range reliability. The EDTO reliability programme can be a supplement to an existing reliability programme if the existing programme is event oriented.

(5) Engine/APU oil consumption monitoring programme. This programme must monitor oil consumption on a flight-by-flight basis. This monitoring must take into account the amount of oil added at the departing EDTO stations with a reference to the running average consumption.

Additionally, prior to each extended range leg, the programme must verify the oil system integrity.

(6) Extended range parts control programme. This programme should ensure that distinct EDTO parts, as required by the type design criteria, are utilized to maintain the integrity of systems unique to EDTO. This programme must consider verification of parts placed on the aircraft through parts borrowing and pooling agreements. For further information see Approved Parts/ Parts Pool/Parts Borrowing.

(7) Maintenance training programme. The training programme should focus on extended range awareness for all personnel involved in the extended range maintenance programme. It may be included in the normal maintenance training but should emphasize the special nature of extended range maintenance requirements**.**

(8) Engine Condition Monitoring programme. The air operator's developed engine condition-monitoring programme should provide for surveillance of the extended range programme. This supplemented programme must ensure the continued integrity of the EDTO engine programme while allowing for programme adjustments, as required. See U. S. FAA Advisory Circular 120-42 for reporting and additional requirements.

PROCEDURES

A. Coordination

(1) This task requires coordination among maintenance inspectors and avionics inspectors and liaison with flight operations inspectors.

(2) For questions regarding an EDTO authorization, review the following, as required:

- Nig. CARs

B. References

- US-FAA Advisory Circular 120-42
- Nig. CARs Part 8.6.2.11

C. Checklist NCAA Form No CL:O-AWS034

D. Verify the Compliance of the Aircraft with the Configuration, Maintenance, and

Procedures Document.

E. Evaluate the Operator's Current Maintenance Programme. Request and evaluate the following information for EDTO suitability:

(1) The date of type design and the review of each engine/airframe combination

(2) The in-service experience for each engine/airframe combination, to include the following:

(a) The number of months/years of operational experience with each specific engine/airframe combination

(b) The total number of EDTO and/or domestic operations conducted with the specific engine/airframe

(c) The engine/airframe hours and cycle, to include both total and high time engines

(d) The in-flight shutdown rate (all causes), including the 12-month and 6-month rolling average for both the EDTO and the world fleet.

(e) The unscheduled engine removal rate for both the world fleet and the operator

(f) The mean time between failure (MTBF) for major components

(g) The record of APU start and run reliability

(h) The records of delays and cancellations, with the causes, by the specific aircraft systems

(I) The records of significant operator events, including the phase of flight where the vent occurred, such as:

- Uncommented power changes (surge or rollback)
- Inability to control engine or obtain desired power
- In-flight shutdown events

F. Review the Operator's Manual. The inspector must ensure that the following programmes and procedures have been included as part of the operator's supplemental maintenance programme:

(1) Verification programme, including:

- A list of primary systems
- Conditions that require verification flights

- Procedures for initiating verification actions
- Procedures that monitor and evaluate corrective actions
- Procedures that verify the implementation of corrective action
- Procedures that identify and reverse the adverse trends

(2) Engine condition monitoring programme, including:

- Scope of programme, e.g., data collection and analysis
- Notification procedures for deterioration
- Deterioration monitoring limits for internal engine parts

(3) Reliability programme, including:

- Reporting criteria
- Procedures to ensure reporting of significant individual events (engine shutdowns, flight diversions, etc.)

(4) Engine/APU oil consumption monitoring programme, to include:

- Established limits of consumption
- Procedures for use and verification prior to the start of each extended range leg

(5) Extended range parts control, including:

- Methods of verification of proper parts
- Control procedures during parts pooling and borrowing

(6) Maintenance training programme, to ensure:

- Personnel are aware that an EDTO authorization is in place
- Personnel, including contract personnel, are adequately trained on the special programmes required by an EDTO authorization

(7) Aircraft and Engine Monitoring programme to include:

- Ensuring the continued integrity of the EDTO maintenance programmes
- Ensuring that adjustments are made, as required, to the EDTO

programmes

(8) Procedures that accomplish the following:

- Preclude simultaneous actions from being applied to multiple similar elements in any EDTO-critical system
- Identify EDTO-related tasks on routine work forms and related instructions
- Develop an EDTO over-water service check to verify the status of the aeroplane and ensure certain critical items are acceptable.

G. Analyze Results

(1) If problems are found, return the material to the operator.

(2) If the submitted material is acceptable, forward the material to the NCAA, Airworthiness Department, and DAWS for concurrence.

TASK OUTCOMES

A. Successful completion of this task will result in the following:

- An Extended Diversion Time Operations' Aeroplanes Authorization.
- Amendment to the Operations Specifications

B. Document Task. File all supporting paperwork in the operator's office file.

5.0 FUTURE ACTIVITIES

Normal surveillance.

MONITORING OF EDTO OPERATION

Since extended range programmes have such a great potential for adverse safety impact if not properly administered, inspectors dealing with EDTO must place special emphasis on surveillance activities.

A. Surveillance should include scheduling, coordinating and reviewing the following, as applicable:

- Trend analysis.
- Problem identification and resolution.
- Implementation of corrective actions.

(1) During the surveillance, report events or problems to the Director,

Airworthiness Standards (DAWS) immediately.

(2) In addition to the items required to be reported by the Nigeria Civil Aviation Regulations, the following information should be included:

- In-flight shutdowns.
- Diversions or turn backs.
- Uncommanded power changes or surges.
- Inability to control the engine or obtain desired power.
- Problems in systems considered to have a fundamental influence on flight safety.
- Failure to start APU while airborne.
- Uncommanded in-flight shutdowns of the APU.
- Any other event the inspector considers detrimental to extended diversion time operations.

(3) Items/systems that are considered critical to flight safety include the following:

- Electrical, including batteries.
- Hydraulic.
- Pneumatic.
- Flight instrumentation.
- Fuel.
- Flight control.
- Ice protection.
- Engine start and ignition.
- Propulsion systems instruments.
- Navigation and communications.
- Auxiliary power-units.
- Air conditioning and pressurization.

- Cargo fire suppression.
- Emergency equipment.
- Any other equipment that is required for extended diversion time operations.

(4) The event or problem reports must contain the following information:

- The type of aircraft.
- The registration number of the aircraft.
- The engine type and serial number.
- The total time and cycles, including the last inspection or shop visit.
- The total time since overhaul or inspection of the unit or the system affected.
- The phase of flight, to include climb, cruise and descent. Coordinate with operations inspectors to acquire information such as speed, altitude ambient temperatures, and atmospheric conditions during the event.
- The location and length of the diversion or turn back.
- Any corrective actions taken.
- Any other information pertinent to the event.

(5) Each month, the inspector must acquire and evaluate the following information:

- A summary of in-flight shut-down rates (12 month rolling average)
- Any delays and cancellations.
- All ground events (aborted takeoff, power shortfall or loss, and engine removals).

B. *Approved Maintenance Programme Changes.* Operator submitted maintenance programme changes must meet the following criteria prior to approval:

(1) Necessary maintenance requirements
(2) Changes must be submitted with supporting documentation.

(3) Changes must be submitted at least 60 days prior to the scheduled implementation.

(4) Changes must enhance the programme without deleting or degrading approved programme elements.

NOTE: Under no circumstances should the inspector allow changes to be made to Certification Maintenance Requirements (CMR) or Configuration Maintenance Procedures document (CMP) without prior approval from the NCAA.

C. Trend Analysis

(1) Surveillance should be directed toward the identification and correction of adverse trends found during APU, airframe, and propulsion systems monitoring.

(2) Other indications of adverse trends include the following:

- Repeat write-ups by the pilot.
- The degradation of engine condition.
- High fluid consumption rates
- The recurrence of deficient areas as identified by the carrier's continuing analysis and surveillance programme.
- Any patterns of irregularities, overly frequent repairs, etc.

D. *Reducing Diversion Times.* When adverse trends and/or maintenance problems have been detected, a reevaluation of the operator's programme should be performed.

(1) This re-evaluation should be performed by the operator and the assigned inspector with consultation from the aircraft and powerplant manufacturer.

(2) Based on the results of the re-evaluation, the assigned inspector will make a written recommendation to the DAWS.

E. *Reinstating Diversion Times.* In order to reinstate an operator's diversion times the operator must first develop and submit a Corrective Action Plan to the Director, Airworthiness Standards.

(1) When reviewing the operator-submitted Corrective Action Plan, the assigned Airworthiness Inspector should compare the Corrective Action Plan to the recommendations set forth in the Evaluation Report. The assigned Airworthiness Inspector should cooperate with the operator during the development of the Corrective Action Plan but should not become involved in the actual writing of the plan.

(2) Upon operator initiation of the corrective actions, the assigned Airworthiness Inspector must perform specific surveillance of those corrective actions in addition to the normal surveillance of the EDTO programme.

(a) After a minimum of six months of additional surveillance the assigned Inspector must perform an in-depth audit to verify the effectiveness of the corrective actions.

(b) When the assigned Airworthiness Inspector is satisfied that the problems have been solved, a recommendation can be made to the DAWS for reinstatement or adjustment of the diversion times. For example, a suspended diversion time of 180 minutes could be reinstated to 120 minutes.

PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites

- Knowledge of the regulatory requirements of the Nigeria Civil Aviation Regulations.
- Knowledge of US FAA Advisory Circular 120-42, Extended -Range Operation with Two-Engine Airplanes, as amended.
- Successful completion of an Aircraft Maintenance Reliability Programme Course, when available.
- Successful completion of the Aircraft Systems Training Course, when available.

B. Coordination.

(1) This task requires coordination among maintenance inspectors, avionics inspectors, and operations inspectors and the respective aircraft and powerplant manufacturer.

(2) For questions regarding an EDTO authorization, contact the following as required:

☐ The aircraft/powerplant manufacturer.

☐ The CAA at the State of the manufacturer.

(3) For questions regarding an EDTO Minimum Equipment List, contact the following, as required:

☐ The aircraft/powerplant manufacturer

☐ The CAA at the State of manufacturer

PROCEDURES

A. *Monitor the Operators Programme.* Ensure the following:

(1) The approved extended-range maintenance programmes are followed as outlined in the maintenance manual sections that are referenced in the operations specifications.

(2) Operator-proposed changes to the approved extended-range maintenance programme are submitted to the NCAA for review 60 days prior to implementation.

NOTE: The inspector must report events or problems to the DAWS, immediately.

B. Submit Reports

(1) On a monthly basis a written report should address the following information:

- A summary of in-flight shut down rates.
- Any delays and cancellations.
- All ground events (aborted takeoff, power shortfall or loss, and unscheduled engine removals).

(2) Respond to special events by gathering and submitting the followinginformation:

- Engine condition monitoring and oil condition monitoring programme summaries.
- Component removal failure summaries.
- Pilot reports.
- Any other information, as requested.

C. *Review Trend Analysis.* Perform an immediate evaluation of the operator's programme when any of the following occur:

- The propulsion system IFSD exceeds .05/1000 engine hours for a 120-minute operation (based on a 12 month rolling average).
- The propulsion system IFSD exceeds .03/1000 engine hours for a 180-minute operation (based on a 12 month rolling average).
- Any significant diversions occur due to airframe and/or powerplant induced discrepancies.

NOTE: Consideration must be given to operators with small fleets due to the impact of a single event on the statistical rate. In these circumstances a review of the specific events will be more useful.

D. Reduce Diversion Times

(1) When adverse trends and/or maintenance problems have been detected ensure that an immediate evaluation is performed by the operator and the NCAA. If necessary, contact the aircraft/powerplant manufacturer and/or the CAA at the State of manufacture for consultation.

(2) Submit a report outlining the identified problems and any corrective actions to the Director, Airworthiness Standards.

(3) Based on the results of the evaluation, make a written recommendation and submit it to those identified in D (1) above.

E. Reinstate Diversion Times.

(1) Review and, as appropriate, approve the operator-submitted Corrective Action Plan.

(2) Schedule and conduct an in-depth audit of the EDTO programme corrective actions after a minimum of six months of additional surveillance.

(3) Upon completion of the audit make the appropriate recommendation on the reinstatement or adjustment of the diversion times, in writing.