

CHAPTER 43 MONITOR FAR PART 121 EXTENDED-RANGE OPERATIONS WITH TWO-ENGINE AIRCRAFT (ETOPS)

Section 1 Background

1. PTRS ACTIVITY CODES

A. *Maintenance*: 3647

B. *Avionics*: 5647

3. OBJECTIVE. This chapter describes the process of monitoring a FAR Part 121 operator authorized for extended-range operations with two-engine airplanes under FAR Part 121.161(a).

5. GENERAL. Since extended range programs have such a great potential for adverse safety impact if not properly administered, inspectors dealing with ETOPS 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 surveillance, report events or problems to the Aircraft Evaluation Group, ANM-270 or ANE-270, within 72 hours.

(2) In addition to the items required to be reported by FAR §§ 21.3 and 121.703, the following information should be included:

- In-flight shut downs
- Diversions or turnbacks
- 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 the APU while airborne

- Uncommanded inflight shut-downs of the APU
- Any other event the inspector considers detrimental to extended-range 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 system instruments
- Navigation and communications
- Auxiliary power-units
- Air conditioning and pressurization
- Cargo fire suppression
- Emergency equipment
- Any other equipment that is required for extended range operations

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

- The type of aircraft
- The N-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 turnback
- Any corrective actions taken
- Any other information pertinent to the event

(5) Each month, the inspector must acquire and provide to the Aircraft Evaluation Group the following information:

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

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

- (1) Changes must be submitted with supporting documentation
- (2) Changes must be submitted at least 60 days prior to the scheduled implementation
- (3) Changes must enhance the program without deleting or degrading approved program elements

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

Engineering and/or Flight Standards Service.

C. *Trend Analysis*

(1) Surveillance should be directed toward the identification and correction of adverse trends found during APU, airframes, 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 program
- 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 program should be performed.

(1) This reevaluation should be performed by the operator and the Certificate Holding District Office with consultation from the Propulsion System Reliability Assessment Board (PSRAB).

(2) Based on the results of the reevaluation, the Principal Airworthiness Inspector will make a written recommendation to be submitted to AFS-300.

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 Principal Airworthiness Inspector.

(1) When reviewing the operator-submitted Corrective Action Plan, the Principal Airworthiness Inspector should compare the Corrective Action Plan to the recommendations set forth in the Evaluation Report. The Principal 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 Principal Airworthiness Inspector must perform specific surveillance of those corrective actions in addition to the

normal surveillance of the ETOPS program.

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

(b) When the Principal Airworthiness Inspector is satisfied that the problems have been solved, a recommendation can be made to AFS-300 for reinstatement or adjustment of the diversion times. For example, a suspended diversion time of 180 minutes could be reinstated to 120 minutes.

Section 2 Procedures

1. PREREQUISITES AND COORDINATION REQUIREMENTS

A. Prerequisites

- Knowledge of the regulatory requirements of FAR Part 121
- Knowledge of Advisory Circular 120-42, Extended-Range Operation With Two-Engine Airplanes as amended
- Successful completion of the Air Carrier Airworthiness Inspectors Indoctrination String Course
- Successful completion of the Aircraft Maintenance Reliability Program 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, Regional offices, AFS-400, and AFS-300 or the Propulsion System Reliability Assessment Board (PSRAB), as required.

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

- AFS-300, Maintenance Division
- Aircraft Evaluation Group (AEG)
- Aircraft/Engine Certification Directorate

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

- AFS-300, Aircraft Maintenance Division
- AFS-260, Program Management Branch

3. REFERENCES, FORMS, AND JOB AIDS

A. References

- Operator's manuals
- Operations Specifications

B. Forms

- FAA Form 8400.8, Operations Specifications

C. Job Aids. None.

5. PROCEDURES

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

(1) The approved extended-range maintenance programs 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 program are submitted to the Certificate Holding District Office for review 60 days prior to implementation

NOTE: The inspector must report events or problems to the Aircraft Evaluation Group, ANM-270, or ANE-270, within 72 hours.

B. Submit Reports

(1) On a monthly basis, provide to the Aircraft Evaluation Group the following information:

- A summary of in-flight shut down rates

- Any delays or cancellations
- All ground events (aborted takeoff, power shortfall or loss, and unscheduled engine removals)

(2) Respond to special events by gathering and submitting the following information to the requesting FAA authorities:

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

C. *Review Trend Analysis.* Perform an immediate evaluation of the operator's program 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 Certificate

Holding District Office. If necessary, contact the Propulsion System Reliability Assessment Board (PSRAB) for consultation.

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

(3) Based on the results of the evaluation, make a written recommendation and submit it to AFS-300.

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 ETOPS program 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, to AFS-300.

7. TASK OUTCOMES

A. *File PRTS Transmittal Form*

B. Completion of this task will result in the following:

(1) For normal surveillance, submittal of required reports

(2) For reduction of diversion times, a written recommendation submitted to AFS-300

(3) For reinstatement or adjustment of diversion times, a written recommendation to AFS-300

NOTE: AFS-1, based on the Certificate Holding District Office's recommendation, will have the principal inspector amend or reissue the operations specifications.

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

9. FUTURE ACTIVITIES. Normal surveillance.