

PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA
NOMOR: **KP 465 TAHUN 2013**

TENTANG

PETUNJUK DAN TATA CARA BAGIAN 120 – 42 (*ADVISORY CIRCULAR PART 120 – 42*) TENTANG PERPANJANGAN JARAK OPERASI PESAWAT UDARA PADA PESAWAT BERMESIN DUA (*EXTENDED RANGE OPERATION WITH TWO ENGINE AIRPLANE*)

DENGAN RAHMAT TUHAN YANG MAHA ESA

DIREKTUR JENDERAL PERHUBUNGAN UDARA,

- Menimbang : a. bahwa dalam Peraturan Menteri Perhubungan Nomor: PM 28 Tahun 2013 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 121 (*Civil Aviation Safety Regulation Part 121*) tentang Persyaratan Persyaratan Sertifikasi dan Operasi Bagi Perusahaan Angkutan Udara Yang Melakukan Penerbangan Dalam Negeri, Internasional dan Angkutan Udara Niaga Tidak Berjadwal (*Certification and Operating Requirements : Domestic, Flag, and Supplemental Air Carriers*), telah diatur mengenai perpanjangan jarak operasi pesawat udara pada pesawat bermesin dua (*extended range operation with two engine airplane*);
- b. bahwa untuk melaksanakan hal sebagaimana dimaksud pada huruf a, perlu ditetapkan Peraturan Direktur Jenderal Perhubungan Udara tentang Petunjuk dan Tata Cara Bagian 120 – 42 (*Advisory Circular*) tentang Perpanjangan Jarak Operasi Pesawat Udara pada Pesawat Bermesin Dua (*Extended Range Operation With Two Engine Airplane*);
- Mengingat : 1. Undang-Undang Nomor 1 Tahun 2009 tentang Penerbangan (Lembaran Negara Republik Indonesia Tahun 2009 Nomor 1, Tambahan Lembaran Negara Republik Indonesia Nomor 4956);

2. Peraturan Pemerintah Nomor 3 Tahun 2001 tentang Keamanan dan Keselamatan Penerbangan (Lembaran Negara Republik Indonesia Tahun 2001 Nomor 9, Tambahan Lembaran Republik Indonesia Nomor 4075);
3. Peraturan Presiden Nomor 47 Tahun 2009 tentang Pembentukan dan Organisasi Kementerian Negara sebagaimana diubah terakhir dengan Peraturan Presiden Nomor 91 Tahun 2011;
4. Peraturan Presiden Nomor 24 Tahun 2010 tentang Kedudukan, Tugas, dan Fungsi Kementerian Negara serta Susunan Organisasi, Tugas, dan Fungsi Eselon I Kementerian Negara sebagaimana diubah terakhir dengan Peraturan Presiden Nomor 38 Tahun 2013;
5. Peraturan Menteri Perhubungan Nomor KM 60 Tahun 2010 tentang Organisasi dan Tata Kerja Kementerian Perhubungan;
6. Peraturan Menteri Perhubungan Nomor PM 28 Tahun 2013 tentang Peraturan Menteri Perhubungan Nomor: PM 28 Tahun 2013 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 121 (*Civil Aviation Safety Regulation Part 121*) tentang Persyaratan Persyaratan Sertifikasi dan Operasi Bagi Perusahaan Angkutan Udara Yang Melakukan Penerbangan Dalam Negeri, Internasional dan Angkutan Udara Niaga Tidak Berjadwal (*Certification and Operating Requirements : Domestic, Flag, and Supplemental Air Carriers*);

MEMUTUSKAN:

Menetapkan : PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA TENTANG PETUNJUK DAN TATA CARA BAGIAN 120 – 42 (*ADVISORY CIRCULAR PART 120 – 42*) TENTANG PERPANJANGAN JARAK OPERASI PESAWAT UDARA PADA PESAWAT BERMESIN DUA (*EXTENDED RANGE OPERATION WITH TWO ENGINE AIRPLANE*).

Pasal 1

Memberlakukan Petunjuk dan Tata Cara Bagian 120 – 42 (*Advisory Circular*) tentang Perpanjangan Jarak Operasi Pesawat Udara pada Pesawat Bermesin Dua (*Extended Range Operation With Two Engine Airplane*), sebagaimana tercantum dalam Lampiran Peraturan ini.

Pasal 2

Pada saat Peraturan ini mulai berlaku, Keputusan Direktur Jenderal Perhubungan Udara Nomor : SKEP/187/VIII/1999 tentang Petunjuk dan Tata Cara Pemenuhan Keputusan Menteri Perhubungan Nomor KM 11 Tahun 1998 Lampiran I, tentang Perpanjangan Jarak Operasi Pesawat Udara Pada Pesawat Bermesin Dua, Bagian 120 - 42 (*Advisory Circular 120 - 42*), dicabut dan dinyatakan tidak berlaku.

Pasal 3

Direktur Kelaikan Udara dan Pengoperasian Pesawat Udara mengawasi pelaksanaan Peraturan ini.

Pasal 4

Peraturan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : Jakarta
pada tanggal : 17 Oktober 2013

DIREKTUR JENDERAL PERHUBUNGAN UDARA

ttd.

HERRY BAKTI

SALINAN Peraturan ini disampaikan kepada:

1. Sekretaris Jenderal Kementerian Perhubungan;
2. Inspektur Jenderal Kementerian Perhubungan;
3. Sekretaris Direktorat Jenderal Perhubungan Udara;
4. Para Direktur di lingkungan Direktorat Jenderal Perhubungan Udara;
5. Para Kepala Kantor Otoritas Bandar Udara;
6. Para Kepala Bandar Udara UPT di lingkungan Direktorat Jenderal Perhubungan Udara;
7. Direktur Utama PT. Angkasa Pura I (Persero);
8. Direktur Utama PT. Angkasa Pura II (Persero).

Salinan sesuai dengan aslinya,

KEPALA BAGIAN HUKUM DAN HUMAS
SETRATJEN PERHUBUNGAN UDARA



ISRAFUHAYAT

Advisory Circular

AC 120-42

EXTENDED OPERATION (ETOPS)

Amendment : 1
Date : June 2013

FOREWORD

- 1 **PURPOSE** : This Advisory Circular has been prepared to guide and assist in obtaining approval under CASR Section 121.161 for Extended Operation. This Advisory Circular should be distributed to the public, particularly those interested in aviation.
- 2 **REFERENCES** : This Advisory Circular is advisory only and should be used in accordance with the applicable regulations.
- 3 **CANCELLATION** : Advisory Circular Number 120-42 issued on April 1999 is cancelled.
- 4 **AMENDMENT** : Amendment of this Advisory Circular will be approved by the Director General of Civil Aviation.

DIRECTOR GENERAL OF CIVIL AVIATION

ttd.

HERRY BAKTI

Salinan sesuai dengan aslinya,

KEPALA BAGIAN HUKUM DAN HUMAS
SETDIJEN PERHUBUNGAN UDARA



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CHAPTER 1. GENERAL

100. APPLICABILITY.

This advisory circular (AC) concerns those certificate holders applying for approval to conduct Extended Operations (ETOPS) under CASR part 121, section 121.161, as well as those certificate holders applying for approval to conduct flights where a portion of which traverse either the North or South Polar Areas, as defined in part 121, section 121.7(b). This AC also provides guidance in resolving operational issues to certificate holders currently conducting such operations.

101. CANCELLATIONS.

The following AC is canceled:

AC 120-42, Extended Range Operation with Two-Engine Airplanes (ETOPS), revision 0, dated April 1999.

102. RELATED REGULATIONS.

CASR part 21 ; part 25 ; part 121, section 121.7, 121.97, 121.99, 121.106, 121.122, 121.135, 121.161, 121.162, 121.191, 121.197, 121.374, 121.565, 121.624, 121.625, 121.631, 121.633, 121.646, 121.687, 121.689, 121.703, and 121.705; and part 121 appendix P.

CHAPTER 2. BACKGROUND ON ETOPS

200. ETOPS REGULATORY REQUIREMENTS.

- a. All two-engine airplanes and three- and four-engine passenger-carrying airplanes operated under part 121 are required to comply with section 121.161. This regulation imposes special requirements for ETOPS for these airplanes. These operations are defined as:
 - 1) **Two-Engine Airplanes.** These are flights whose planned routing contains a point farther than 60 minutes flying time from an adequate airport at an approved one-engine inoperative cruise speed under standard conditions in still air.
 - 2) **Passenger-Carrying Airplanes with More Than Two Engines.** These are flights whose planned routing contains a point farther than 180 minutes flying time from an adequate airport at an approved one-engine inoperative cruise speed under standard conditions in still air.
- b. To conduct ETOPS, the specified airplane-engine combination must be certificated to the airworthiness standards of transport-category airplanes and be approved for ETOPS. As with all other operations, a certificate holder requesting any route approval must first show that it is able to satisfactorily conduct operations between each required airport as defined for that route or route segment, and any required en route alternate airport. Certificate holders must show that the facilities and services specified in section 121.97 through 121.127 (domestic, flag operations, and supplemental operation) are available and adequate for the proposed operation. In addition, the certificate holder must be approved for ETOPS under part 121. This AC provides the additional guidance for certificate holder approval for ETOPS.

CHAPTER 3. REQUIREMENTS FOR ETOPS AUTHORIZATION

300. ETOPS REQUIREMENTS.

The DGCA may approve ETOPS for various areas of operation in accordance with the requirements and limitations specified in part 121, appendix P. ETOPS must be authorized in the certificate holder's ACL and conducted in compliance with those sections of part 121 applicable to ETOPS.

- a. Certificate holders operating passenger-carrying airplanes with more than two engines is required to comply with all the applicable ETOPS flight operational regulations described in this AC, and must have their ETOPS programs and processes approved by DGCA.
- b. The certificate holder's ETOPS requirements must be specified in their maintenance and operations programs. Maintenance requirements necessary to support ETOPS are explained in paragraphs 301 and 302. Flight operations requirements necessary to support ETOPS are described in paragraphs 303 and 304.
- c. The requirements for the various levels of ETOPS authorities are listed in tabular form in Appendix 2.

301. MAINTENANCE REQUIREMENTS FOR TWO-ENGINE ETOPS AUTHORIZATION.

The certificate holder conducting ETOPS with two-engine airplanes must comply with the ETOPS maintenance requirements as specified in section 121.374. These requirements are discussed in paragraphs a through o as follows:

a. Continuous Airworthiness Maintenance Program (CAMP).

The basic maintenance program for the airplane being considered for ETOPS is a CAMP that may currently be approved for a non-ETOPS certificate holder for a particular make and model airplane-engine combination. The basic CAMP must be a maintenance and inspection program that contains the instructions for continued airworthiness (ICA) based on the manufacturer's maintenance program, or those contained in a certificate holder's maintenance manual approved in its ACL. The certificate holder and PMI must review the CAMP to ensure it provides an adequate basis for development of a ETOPS maintenance program. The certificate holder's ETOPS CAMP must include specific ETOPS requirements, which will be incorporated as supplemental requirements to the basic CAMP. These supplemental requirements include the enhanced maintenance and training processes that will ensure ETOPS

airplanes achieve and maintain the level of performance and reliability necessary for ETOPS operations. These supplemental requirements, referred to in the industry as ETOPS processes or ETOPS process elements, currently should be in place for existing ETOPS operations. Prospective ETOPS certificate holders must supplement their basic CAMP with those program elements defined in paragraphs b through o below.

b. ETOPS Maintenance Document.

The certificate holder must develop a document for use by personnel involved in ETOPS. This may be a separate document or a part of other maintenance documents. It need not be inclusive but should, at least, reference the maintenance program and other pertinent requirements clearly indicating where all facets of the ETOPS maintenance program are located in the certificate holder's document system. All ETOPS requirements, including supportive programs, procedures, duties, and responsibilities, must be identified. The ETOPS document(s) must reflect the actual policies and procedures the certificate holder expects their ETOPS maintenance personnel to adhere to. The document(s) should be user friendly, and be accessible to all affected personnel. The initial document must be submitted to the DGCA and be approved before being adopted.

c. ETOPS PRE-DEPARTURE SERVICE CHECK (PDSC).

- 1) The certificate holder must develop an ETOPS PDSC to verify that the airplane and certain significant items are airworthy and ETOPS capable. Each certificate holder's PDSC may vary in form and content. The prerequisites for an acceptable PDSC are content and suitability for the specific certificate holder's needs.
- 2) All certificate holders must address ETOPS significant system airworthiness in their ETOPS maintenance program, including the PDSC. Specifically, the PDSC is a maintenance task that should include an applicable maintenance records review and an interior and exterior inspection. The PDSC is sometimes referred to as an expanded transit check inspection. The PDSC should include visual inspections and procedures applicable to determining ETOPS Significant Systems airworthiness status. The airworthiness status determination should include a process for determining engine and auxiliary power unit (APU) oil quantities, and consumption rates prior to ETOPS dispatch.

NOTE: Proper servicing of fluids, such as engine, APU, generator systems, and hydraulic systems is a vital ingredient to successful ETOPS operations. Some current ETOPS operators have had incidents resulting from improper fluid servicing, or not properly determining or addressing high consumption rates. This has resulted in IFSDs and diversions. Certificate holders should consider this area very seriously when developing their maintenance checks, including the PDSC.

- 3) Some certificate holders may elect to include tasks in the PDSC that are driven by their reliability programs and are not related to ETOPS significant systems.

However, the certificate holder must clearly identify the ETOPS related tasks on their PDSC if non-ETOPS qualified maintenance personnel are to accomplish the non-ETOPS tasks. An appropriately trained maintenance person, who is ETOPS qualified, and authorized by the certificate holder, must accomplish and certify by signature the completion of ETOPS specific tasks. An appropriately trained person who is ETOPS qualified and authorized by the certificate holder must certify by signature, that the ETOPS pre-departure service check has been completed. Appropriately trained persons are those that have satisfactorily completed the certificate holder's ETOPS training program. The signatory person that certifies the completion of the PDSC must also meet the following criteria:

- a) Inside the Republic of Indonesia (RoI), the signatory person holds a DGCA AMEL with airframe and powerplant ratings, and works for an operator authorized to engage in part 121 operation, or works for a part 145 repair station.
- b) Outside the RoI, works for an ETOPS maintenance entity and has the requisite experience or specific training needed to accomplish the task and is authorized to complete the PDSC and return the aircraft to service on behalf of the ETOPS maintenance entity; the signatory person does not have to hold a DGCA AMEL.

NOTE: An ETOPS maintenance entity is an entity that has been authorized to perform ETOPS maintenance and authorized by the certificate holder to complete ETOPS pre-departure service checks. That entity is certificated to engage in part 121 operations; a repair station certificated under part 145, or an entity authorized pursuant to section 43.17(c)(2).

- 4) The PDSC must be certified complete immediately before each scheduled ETOPS flight. The term "immediately" has historically meant to be no more than 2 to 4 hours before the flight. However, the DGCA may grant some relief from this time period under certain conditions. The certificate holder should explain any rationale for such deviations in its ETOPS maintenance document, which is approved by DGCA. A PDSC may not be required before all ETOPS flights. The DGCA may grant relief following irregular operations because of non-mechanical issues, such as weather or medical emergency diversions, or when operating ETOPS into specific areas of operation. For example, if an airplane scheduled for an ETOPS flight receives a PDSC before departure and subsequently must divert or turn back for reasons other than mechanical, the certificate holder must identify in its ETOPS maintenance document what procedures its flight operations and maintenance personnel would follow to preclude performing another PDSC. If a mechanical discrepancy develops as a result of the diversion or turn back, the certificate holder may have to perform another PDSC. For example, when an overweight landing inspection reveals an ETOPS Significant System discrepancy that requires maintenance intervention, another PDSC is required

d. Dual Maintenance.

- 1) ETOPS dual maintenance, otherwise referred to as identical maintenance, multiple maintenance, and simultaneous maintenance, requires special consideration by the certificate holder. This is to recognize and preclude common cause human failure modes. Proper verification processes or operational tests, prior to ETOPS, are required when dual maintenance on significant systems occurs.
- 2) Dual maintenance on the "same" ETOPS Significant System can be described as actions performed on the same element of identical, but separate ETOPS Significant Systems during the same routine or non-routine visit. Examples of maintenance on the "same" ETOPS Significant System are: maintenance on both air cycle machines (or equivalent) in the air conditioning systems during a turnaround flight; removal of either both engine oil filters, or both chip detectors; and replacement of both chip detectors.
- 3) Dual maintenance on "substantially similar" ETOPS Significant Systems specifically addresses maintenance actions on engine-driven components on both engines. An example of dual maintenance on "substantially similar" ETOPS Significant Systems could include: replacement of the No. 1 Integrated Drive Generator (IDG) and the No. 2 Engine Driven Pump (EDP).
- 4) The certificate holder must establish procedures that minimize identical maintenance actions from being scheduled or applied to multiple similar elements in any ETOPS Significant System during the same routine or non-routine maintenance visit. In order to manage this requirement the certificate holder must develop a list of fleet-specific ETOPS Significant Systems and include them in their ETOPS maintenance document(s).
- 5) The DGCA recognizes that sometimes ETOPS dual maintenance actions cannot be avoided or precluded because of unforeseen circumstances that occur during ETOPS operations. In the line maintenance arena, one example would be when an ETOPS airplane has inbound discrepancies on both engines' oil systems, or there is a generator replacement on one engine, and an oil system discrepancy on the other engine. Additionally, staggering maintenance on ETOPS Significant Systems in the heavy maintenance arena is not always possible or feasible. However, to minimize human factor common cause risk, the certificate holder should attempt to minimize dual maintenance on ETOPS Significant Systems wherever/whenever possible.
- 6) In any event, when dual maintenance is performed on a ETOPS Significant System, the certificate holder must have written procedures in its ETOPS maintenance document that addresses this situation. At a minimum, the certificate holder must ensure:
 1. Separate ETOPS-qualified maintenance persons perform the tasks,
 2. The maintenance action on each of the elements in the ETOPS Significant System is performed by the same technician under the direct supervision of a second

ETOPS qualified individual, and

3. It verifies the effectiveness of the corrective actions to those ETOPS Significant Systems before the airplane enters the ETOPS area of operation. This verification action must be performed using ground verification methods, and in some instances, in-flight verification methods described in the next section of this AC. On an exception basis, the same ETOPS—qualified technician, under the supervision of an ETOPS qualified Centralized Maintenance Control person, may perform the dual maintenance and the ground verification methods only if in-flight verification action is performed.

- 7) The DGCA acknowledges that the servicing of fluids and gases is not considered maintenance; however, these tasks, when done improperly have adversely affected ETOPS operations. The certificate holder should recognize the hazard associated with improper servicing and do all possible to mitigate the associated risk. Specifically, servicing tasks such as engine, APU, and generator system oil servicing are tasks that require high levels of attention. The DGCA encourages the certificate holder to ensure that its programs have separate individuals perform such servicing. However, the DGCA recognizes that many certificate holder's route and organizational structures may not lend themselves to these procedures. The certificate holder's program should include detailed servicing instructions, or make readily available servicing instructions. Additionally, the certificate holders should consider including oil servicing in their ETOPS OJT program, regardless of whether one individual or multiple individuals perform the tasks.

e. Verification Program.

- 1) The certificate holder must develop a verification program for resolution of airplane discrepancies (corrective actions) on ETOPS significant systems. This program must include corrective action confirmation in specific areas such as engine shutdown, significant system failure, adverse trends, or any prescribed event that could effect an ETOPS operation. The program must ensure corrective action is taken and confirmed successful before the airplane enters an ETOPS area of operation. The certificate holder must verify the effectiveness of the corrective actions following the maintenance action and prior to an ETOPS flight or prior to passing the ETOPS entry point. The ground verification method is accomplished by following the ICA contained in the Airplane Maintenance Manuals (AMM) or the certificate holder's maintenance manuals. These ICAs include built-in test equipment (BITE) and functional/operational checks that often include leak checks after ground runs.
- 2) Normally ground verification is acceptable to ensure corrective action. Under certain conditions ground verification beyond that recommended in the ICA or in-flight verification may be required. An example of a condition that would require an in-flight verification is the replacement of an APU component that could affect

the APU's ability to start at the ETOPS cruise altitude after cold soak. In-flight verification may be conducted on revenue flights, provided the action is completed before the ETOPS entry point. In those cases where the verification flight will reach the ETOPS entry point approximately 60 minutes into the flight, e.g., departing from an island, and the inflight verification is for APU inflight starting which requires a two-hour cold soak, (see paragraph 301m., "APU In-Flight Start Program"), the operator can initiate the flight with the APU running and shut it down two hours prior to top of descent and initiate the inflight APU start before top of descent. Ground maintenance personnel should coordinate with flight operations personnel whenever an in-flight verification is required. Each certificate holder must identify its ETOPS significant systems, ground verification requirements, and in-flight verification requirements in its ETOPS maintenance document.

- 3) The certificate holder must establish a means to ensure any required verification action is accomplished. The certificate holder must include a clear description of who initiates verification actions and who is responsible for completing the actions in its ETOPS maintenance document.

f. Task Identification.

The certificate holder must identify all tasks that must be accomplished or certified as complete by ETOPS-qualified maintenance personnel. The intent is to have ETOPS-trained maintenance personnel accomplish these tasks because they are related to ETOPS. ETOPS specific tasks must be:

- 1) The certificate holder must identify all tasks that must be accomplished or certified as complete by ETOPS qualified personnel. The intent is to have ETOPS trained maintenance personnel accomplish these identified tasks because they are related to ETOPS. ETOPS specific tasks should be:
 - a) Identified on the certificate holder's work forms and related instructions, or
 - b) Parceled together and identified as an ETOPS package.
- 2) If a certificate holder does not identify ETOPS-related task in their current maintenance program, then all tasks must be accomplished by ETOPS-qualified personnel.

g. Centralized Maintenance Control Procedures.

An ETOPS certificate holder, regardless of the size of its ETOPS fleet, must have a centralized entity responsible for oversight of the ETOPS maintenance operation. The certificate holder must develop and clearly define in its ETOPS maintenance document specific procedures, duties, and responsibilities for involvement of their centralized maintenance control personnel in the ETOPS operation. These established procedures and centralized control processes would preclude an airplane from being dispatched for ETOPS flights after an engine IFSD, ETOPS significant system failure, or discovery of significant adverse trends in system performance without appropriate corrective action having been taken.

h. ETOPS Parts Control.

The certificate holder must develop a parts control program to ensure the proper parts and configurations are maintained for ETOPS. The program must include procedures to verify that the parts installed on ETOPS airplanes during parts borrowing or pooling arrangements, as well as those parts used after repair or overhaul, maintain the required ETOPS configuration.

i. Reliability Program.

- 1) The certificate holder must develop an ETOPS reliability program or enhance its existing reliability program to incorporate the ETOPS supplemental requirements. This program must be designed with early identification and prevention of ETOPS-related problems as the primary goal. The program must be event-oriented, and incorporate reporting procedures for significant events detrimental to ETOPS flights. For those certificate holders that do not have an DGCA-approved reliability program, their Continuing Analysis and Surveillance System (CASS) must be enhanced to achieve ETOPS reliability goals. The certificate holder should submit regular ETOPS reliability reports to DGCA. The frequency of such reporting should be agreed upon between the certificate holder and the DGCA. Customarily, monthly reports have been deemed an acceptable frequency.
- 2) In addition to the reporting requirements in section 121.703, the certificate holder must report the following items on their ETOPS airplanes (regardless of ETOPS or Non-ETOPS operation) within 72 hours to DGCA:
 - a) IFSDs, except planned IFSDs performed for flight training.
 - b) Diversions and turnbacks for failures, malfunctions, or defects associated with any ETOPS Significant Systems.
 - c) Uncommanded power or thrust changes or surges.
 - d) Inability to control the engine or obtain desired power or thrust.
 - e) Inadvertent fuel loss or unavailability, or uncorrectable fuel imbalance in flight.
 - f) Failures, malfunctions or defects associated with ETOPS Significant Systems.
 - g) Any event that would jeopardize the safe flight and landing of the airplane on an ETOPS flight.
- 3) The reporting of any of the above items must include the information specified in section 121.703(e).
- 4) The certificate holder must conduct an investigation into the cause of the occurrence of any event listed in section 121.703 and section 121.374(h)(1) and submit its findings to DGCA.

NOTE: The DGCA encourages operator investigations include manufacturers when feasible. If the DGCA determines additional corrective action is necessary, the certificate holder must further investigate and implement appropriate corrective action acceptable to the DGCA

j. Propulsion System Monitoring.

- 1) The certificate holder must monitor its fleet average IFSD rate for the specified airplane-engine combination. It should establish firm criteria regarding the actions it will take when it detects adverse trends in propulsion system conditions. If the IFSD rate, computed on a 12-month rolling average, exceeds the values in the following table, the certificate holder, in conjunction with DGCA, must investigate common cause effects or systemic errors and submit the findings to DGCA within 30 days.

NOTE: It may be applicable to combine some similar airplane-engine combinations, due to the commonality of engine type, e.g., 777-200LR and -300ER with GE90-110/115B engine, where the engine build is the same and operations are similar.

In Flight Shut Down Rates

Number of Engines	Engine Hours ETOPS	ETOPS Authorization
2	.05/1000	Up to and including 120 minutes.
2	.03/1000	Beyond 120 minutes up to and including 180 minutes and 207 minutes in North Pacific.
2	.02/1000	Greater than 180 minutes (Except for 207 minutes in North Pacific).

- 2) With respect to maintenance, the purpose of monitoring IFSD rates is to provide DGCA and operators with a tool for measuring the health of a fleet of ETOPS-approved airplanes in service. Causes of IFSDs or other engine and propulsion system problems may be associated with type design problems and/or maintenance and operational procedures applied to the airplane. It is very important that the certificate holder identify the root cause of events so that an indication of corrective action is available, such as a fundamental design problem that requires an effective hardware (or software) final fix. Repetitive inspections may be satisfactory as interim solutions, but longer-term design solutions, such as terminating actions, may be required if possible. Design problems can affect the whole fleet. The DGCA will not revoke an existing ETOPS operational approval solely because of a high IFSD rate. A certificate holder who experiences a type design related event need not be operationally penalized for a problem that is design-related and may not be of their own making. However, maintenance or operational problems may be wholly, or partially, the responsibility of the certificate holder. If a certificate holder has an unacceptable IFSD rate risk attributed to common cause or a systemic problem in operational practices or the maintenance program, then action carefully tailored to that certificate holder may be required, and may include a reduction of the certificate holder's diversion limit.
- 3) The certificate holder must investigate an IFSD rate higher than the 12-month rolling average standard that occurs for a mature fleet after the commencement of

ETOPS (Refer to the IFSD Rates table above). The certificate holder must investigate any indication of a high IFSD rate; however, it should consider that in the case of the smaller fleet, the high IFSD rate may be because of the limited number of engine operating hours used as the denominator for the rate calculation. This can cause an IFSD jump well above the standard rate because of a single IFSD event. The underlying causes for such a jump in the rate will have to be considered by the Administrator's representative. On occasion, a particular event may also warrant implementation of corrective action even though the overall IFSD rate is not being exceeded.

- 4) The 30-day reporting criteria of paragraph 301j(1) is intended to ensure that the certificate holder provides the DGCA timely notification of the status of an event investigation. The certificate holder may or may not have root cause or terminating action at the end of the 30-day period, and further discussions with the DGCA may be required after this period.
- 5) The certificate holder may designate a sub-fleet engine/airframe combination for the purposes of the IFSD monitoring/rate program. The operator may include the IFSD statistics of all engines that are ETOPS configured and are maintained in accordance with the operators ETOPS program even if used on non-ETOPS airplanes.

k. Engine Condition Monitoring.

The certificate holder must develop a program for its ETOPS engines that describes the parameters to be monitored, method of data collection, and corrective action processes. The program should reflect the manufacturer's instructions and industry practices, or the certificate holder should establish a program that demonstrates an equivalent level of monitoring and data analysis. The goal of this monitoring program is to detect deterioration at an early stage, and to allow for corrective action before safe operation is affected. In order to achieve this goal, engine data analysis should be accomplished as often as practical. The recommended maximum interval is five days. Engine limit margins must be maintained so that prolonged engine inoperative diversions may be conducted without exceeding approved engine limits (for example, rotor speeds and exhaust gas temperature) at all approved power levels and expected environmental conditions. Engine margins preserved through this program should account for the effects of additional engine loading demands (for example anti-ice and electrical), which may be required during IFSD flight phase associated with the diversion. If oil analysis monitoring, such as the Spectrographic Oil Analysis Program (SOAP), is meaningful and recommended by the manufacturer, the certificate holder should include it in their program.

l. Oil Consumption Monitoring.

The certificate holder must develop an engine oil consumption monitoring program to ascertain that there is enough oil to complete the scheduled ETOPS flight. The certificate holder's consumption limit must not exceed the manufacturer's recommendations, and it must trend oil consumption. The certificate holder's oil consumption trending program should be capable of recognizing a spike in the oil

consumption rate. A certificate holder who operates an ETOPS aircraft in ETOPS and non-ETOPS operations may elect to develop a program that documents the indicated flight deck oil quantity at each NonETOPS station to supplement their oil consumption trend monitoring programs capability to discover an oil spike. For example, if an ETOPS airplane oil is serviced infrequently, and the quantities aren't regularly recorded, it would be difficult to determine whether the oil added during an ETOPS pre-departure check was the result of normal oil consumption over several flight hours, or a sudden increase which would merit investigation and corrective action prior to the ETOPS flight. The certificate holders trending program may be done manually or by electronic means. The program must consider the amount of oil added at the departing ETOPS station with reference to the running average consumption, as well as monitor for sudden increases in consumption. The monitoring must be continuous including non-ETOPS flights and the oil added at the ETOPS departure station. For example, after servicing, the oil consumption may be determined by maintenance personnel as part of the pre-departure check. The amount of oil added also could be reported to a centralized maintenance control for calculation before the ETOPS flight. If the APU is required for ETOPS, it must be included in the oil consumption monitoring program. Any corrective actions taken regarding oil consumption must be verified before ETOPS departure.

m. APU In-Flight Start Program.

- 1) If the airplane type certificate requires an APU but does not normally require the APU to operate during the ETOPS portion of the flight, the certificate holder must develop an in-flight start and run reliability program to ensure that the APU will continue to provide the performance and reliability established by the manufacturer. Specifically, the program is intended to verify the start and run capability. It is not required to actually load the APU in flight with the generator and/or pneumatics. This monitoring program must include periodic sampling of each airplane's APU in-flight starting capabilities. Specifically, the certificate holder must ensure that each airplane's APU periodically is sampled rather than repeatedly sampling the same APUs. The certificate holder may adjust sampling intervals according to system performance and fleet maturity. The certificate holder and DGCA should periodically review the certificate holder's APU in-flight start program data to ensure that the in-flight start reliability is maintained. Should the rolling 12-month APU in-flight start rate drop below 95 percent, the certificate holder should initiate an investigation into any common cause effects or systemic errors in procedures.
- 2) The certificate holder should include the criteria below in their APU in-flight start program. The certificate holder should make APU in-flight starts subject to the following conditions:
 - a) In-flight APU starts do not need to be performed on ETOPS flights; however, the APU must be in the ETOPS configuration in accordance with the appropriate CMP document, if applicable, for credit to be allowed.
 - b) If in-flight APU start is performed on an ETOPS flight, the start may be attempted on the return leg.

- c) The start attempt should be initiated before top of descent, or at such time that will ensure a 2-hour cold soak at altitude before the start attempt.
 - d) Within route or track constraints, the objective would be met by attempting a start near the highest altitude assigned the route or track, and the final attempt near the lower altitude limits of the route or track, as defined by ATC. These altitudes should be representative of the ETOPS routes flown.
 - e) 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's recommended procedures.
- 3) The certificate holder must report any operationally required APU in-flight start failures occurring during actual ETOPS operations to DGCA within 96 hours. The certificate holder also must report any occurrences of an ETOPS configured APU in-flight unsuccessful start attempt occurring during routine sampling (which exceed the airframe and APU manufacturer design specifications) to DGCA. The final report should include corrective actions taken as well as the status of corrective action programs and fleet upgrades.

n. Configuration Maintenance and Procedures (CMP).

- 1) The CMP Standard specifies any additional configuration, maintenance or operational requirement that is uniquely applicable to ETOPS. The requirements in the CMP are established by the DGCA at the time of initial ETOPS type design approval of the airplane-engine combination. The CMP document typically is published and maintained by the airplane manufacturer and includes identified CMP requirements. Airplane manufacturers may continue to release CMP revisions beyond the basic revision level required for ETOPS. The CMP revision levels required for specific airplane-engine combinations are typically listed in the front of the CMP or may be controlled through issuance of customized CMP documents. The Certificate holder must implement the basic configuration, maintenance, and operating procedures standard, identified in the CMP, before beginning ETOPS operations unless the CMP includes an incorporation schedule with a later date than the beginning of the certificate holder's ETOPS operations. If a CMP document exists for an ETOPS certificate holder's airplane, the certificate holder must ensure that all of the following apply:
- a) Configuration features are installed in the airplanes and engines;
 - b) Maintenance procedures are incorporated into the maintenance program;
 - c) Demonstrated capabilities are incorporated into the flight operations manual and the minimum equipment list, as required; and
 - d) Operators must coordinate any deviation from the manufacturer's CMP requirements with the DGCA as required by the CMP document.
- 2) Each certificate holder must develop a system to ensure all CMP requirements remain incorporated in its airplanes, programs, and manuals throughout the operational life of each airplane, for as long as they operate in ETOPS.
- 3) The DGCA will mandate any subsequent configuration, maintenance, or procedural

changes necessary for continued safe ETOPS operations through the Airworthiness Directive (AD) process. The certificate holder should review and consider voluntarily incorporating any revised CMP standard that enhances airplane reliability and/or performance.

- 4) The certificate holder should provide DGCA a matrix detailing the CMP standard for its proposed ETOPS fleet. The matrix should specifically include each CMP item number, revision level, item description, and reference documentation describing the incorporation method and date.

o. Procedural Changes.

Refer to Chapter 5, paragraph 502 for ETOPS maintenance and training program changes.

302. ETOPS MAINTENANCE TRAINING REQUIREMENTS.

- a. The certificate holder is responsible for ensuring that all maintenance personnel who perform maintenance on its ETOPS airplanes, including AMO, vendors, and contract maintenance, have received adequate technical training for the specific airplane-engine combination it intends to operate in ETOPS. The certificate holder should review the existing airplane-engine combination maintenance training program with the DGCA to ensure that it adequately provides the necessary training.
- b. Additionally, the certificate holder must develop ETOPS specific training that focuses on the special nature of ETOPS and take measures to insure that this training is given to all personnel involved in ETOPS. ETOPS specific training is in addition to the certificate holder's accepted maintenance training program used to qualify individuals for specific airplanes and engines and may be included in the accepted maintenance training curricula. It thus, becomes the certificate holder's ETOPS training program. The goal of this training is to ensure that all personnel involved in ETOPS properly accomplish ETOPS maintenance requirements. The certificate holder is responsible with acceptance from the DGCA to determine which personnel are involved in ETOPS, and ensure that each person's level of ETOPS training is commensurate with their level of involvement with ETOPS airplanes. Customarily, ETOPS training is intended for Line and Hanger Maintenance personnel, Centralized Maintenance Control personnel and Engineering personnel, where applicable, but it does not necessarily include the various shop level employees. For example, a mechanic who is performing pre-departure service checks may be required to have a higher level of ETOPS training and qualification than a mechanic performing routine tasks on non ETOPS significant systems during a heavy maintenance check. A technician working ETOPS significant systems in an HMV (Heavy Maintenance Visit) environment must be appropriately trained for ETOPS, but need not be ETOPS qualified. Recurrent training in all maintenance areas should be established and used to inform personnel involved in ETOPS about new equipment, requirements, operator programs, etc. Experience has shown recurrent training is a valuable instrument in "lessons learned"

for ETOPS operations.

- c. In the line maintenance environment, ETOPS-qualified maintenance personnel are those who have successfully completed the certificate holder's ETOPS qualification program, and who have satisfactorily performed extended range tasks under the direct supervision of a DGCA AMEL holder. The person giving the direct supervision must have had previous experience with maintaining the particular make and model airplane being used by the certificate holder. For new airplanes, it is understood the certificate holder may not have a DGCA AMEL holder available who has previous experience with the newly introduced make and model airplane. In this instance, the training received from the manufacturer's maintenance training program, or a comparable program would be acceptable.

303. ETOPS FLIGHT OPERATIONS REQUIREMENTS.

a. Airplane Performance Data.

The certificate holder may not dispatch an airplane on an ETOPS flight unless it makes performance data available to its flight crewmembers and dispatchers that support all phases of ETOPS operations, including divert scenarios. This performance data will contain the following information:

- 1) Detailed one-engine inoperative performance data including fuel flow for standard and nonstandard atmospheric conditions, which should be demonstrated as a function of airspeed and power setting, where appropriate. This data will cover:
 - a) Driftdown (includes net performance);
 - b) Cruise altitude coverage including 10,000 feet;
 - c) Holding; and
 - d) Altitude capability (includes net performance).
- 2) Detailed all-engine-operating performance data, including nominal fuel flow data, for standard and nonstandard atmospheric conditions, which should be demonstrated as a function of airspeed and power setting, where appropriate. This data will cover:
 - a) Cruise altitude coverage including 10,000 feet; and
 - b) Holding.
- 3) Details of any other conditions relevant to ETOPS that can cause significant deterioration of performance, such as ice accumulation on the unprotected surfaces of the airplane, RAM Air Turbine (RAT) deployment, and thrust reverser deployment if such data is available.

b. En Route Airport Information.

- 1) In accordance with section 121.97, the certificate holder must maintain current status information on the operational capabilities of the airports designated for use as ETOPS alternates. "Public protection" has been a historic requirement for all domestic and flag operations. For ETOPS greater than 180

minutes and for operations traversing the North and South Polar Areas, this requirement has been expanded to include the listing of facilities at each airport, or in the immediate area, sufficient to protect the passengers and crew from the elements and to see to their welfare. Such a requirement can be interpreted to encompass the time from landing until satisfactory recovery of passengers and crew based on the certificate holder's passenger recovery plan required by section 121.135 and discussed in Chapter 4, paragraph 403c(5) of this AC.

- 2) The certificate holder's program should provide flight crewmembers with current weather and information on a set of adequate airports in the ETOPS portion of the flight that are within the maximum diversion capability of the airplane on the planned route of flight as an aid to the flight crew in contingency planning. Any appropriate facility information and other data concerning these airports should be provided to flight crewmembers in a clear, concise, user-friendly format for use when planning a diversion.
- 3) Section 121.135 requires that any certificate holder conducting passenger flag operations must include in their flight operations manuals or equivalent documentation available to the flight crews:
 - a) For ETOPS greater than 180 minutes, a specific passenger recovery plan for each ETOPS Alternate Airport used in those operations; and
 - b) For operations in the North Polar Area and South Polar Area, a specific passenger recovery plan for designated diversion airports.

c. Dispatch.

- 1) **Alternates.** A certificate holder may not dispatch an airplane in ETOPS unless the required takeoff, destination and alternate airports, including ETOPS alternate airports are listed in the cockpit documentation (e.g., computerized flight plan) and are identified and listed in the dispatch release. Because ETOPS alternates serve a purpose different from that of a destination alternate, and may be used in the event of a diversion with an engine failure or loss of a primary airplane system, a certificate holder should not list an airport on the dispatch/flight release as an ETOPS alternate unless that airport's services and facilities are adequate for such a diversion. A certificate holder of a two-engine airplane should exercise ETOPS beyond 180 minutes authority only if there are no ETOPS alternates that are within a 180-minute diversion distance from the planned route of flight. In addition, those adequate airports closest to the planned route of flight should be those first considered as ETOPS alternates.
- 2) **Flight Planning Limitation.** The certificate holder's ETOPS flight planning program must ensure that the planned route of flight remains within the authorized ETOPS area of operation in accordance with section 121.633 as follows:
 - a) For ETOPS up to and including 180 minutes and 207 minutes in the North Pacific Area of Operation, the time required to fly the distance to the planned ETOPS alternate, at the approved one-engine inoperative cruise speed in still air

- and standard conditions, may not exceed the time specified for the airplane's most time limited ETOPS significant system (including cargo fire suppression) minus 15 minutes.
- b) For ETOPS beyond 180 minutes, the time required to fly the distance to the planned ETOPS alternate, at the all-engines-operating cruise speed at the normal all-engine cruise altitude, correcting for wind and temperature, may not exceed the certified capability for the airplane's most limiting fire suppression system minus 15 minutes.
 - c) Further, for ETOPS beyond 180 minutes, the time required to fly the distance to the planned ETOPS alternate, at the approved one-engine inoperative cruise speed at the normal one engine inoperative level off altitude, correcting for wind and temperature, may not exceed the certified capability for the airplane's most time limited ETOPS significant system (except for the most limiting fire suppression system) minus 15 minutes
- 3) Landing Distance.** For the runway expected to be used, the landing distance available, as specified by the airport authority, must be sufficient based on airplane flight manual landing performance data to meet the landing distance limitations specified in section 121.197. The altitude of the airport, wind conditions, runway surface conditions, and airplane handling characteristics should be taken into account.
- 4) Airport Rescue and Fire Fighting Service (RFFS)**
- a) The following minimum International Civil Aviation Organization (ICAO) RFFS categories must be available at each airport listed as an ETOPS Alternate Airport in a dispatch or flight release:
 - 1. ETOPS Up to 180 Minutes. ETOPS alternates with ICAO Category 4.
 - 2. ETOPS Greater than 180 Minutes. ETOPS alternates with Category 4. In addition, the airplane must remain within the ETOPS authorized diversion time from an Adequate Airport that has RFFS equivalent to that specified by ICAO Category 7, or higher. The availability of Adequate Category 7 RFFS airports should be considered for the entire ETOPS segment of the planned route.
 - b) If the necessary equipment and personnel are not immediately available at the airport, additional fire fighting support may be brought in from a nearby town or other location. The certificate holder must ensure that the nearby facility is capable of responding to a request for firefighting assistance within a reasonable time. A 30-minute response time is deemed adequate if the initial notification to respond can be initiated while the diverting airplane is en route. A 30-minute response time does not imply that the firefighting equipment has to be at the airport within 30 minutes of the initial notification under all conditions. It does mean that such equipment must be available on arrival of the diverting airplane and remain on station as long as the services are needed.

- 5) **ETOPS Alternate Minima.** A particular airport may be considered to be an ETOPS alternate for flight planning and dispatch purposes, if the latest available forecast weather conditions from the earliest time of landing to the latest time of landing at that airport, equals or exceeds the criteria detailed in the following table. Because ACL alternate weather minima standards apply to all alternates, the following criteria is recommended for a typical certificate holder's ACL. An individual certificate holder's ACL must reflect current requirements (section 121.625). Although no consideration for the use of GPS/RNAV approaches is presented here, operators may request to receive this authorization through the DGCA. This authorization would be reflected in the operator's ACL. Appropriate ETOPS alternate minima for such operations will be determined by DGCA. The airport of departure (takeoff) and the destination airport (unless used concurrently as an ETOPS alternate) are not required to meet the weather minima for ETOPS alternates as these airports are subject to other regulations (e.g., section 121.617, 121.621, and 121.623).

ETOPS Alternate Minimum

Approach Facility Configuration¹	Alternate Airport IFR Weather Minimum Ceiling²	Alternate Airport IFR Weather Minimum Visibility³
For airports with at least one operational navigational facility providing a straight-in non-precision approach procedure, or Category I precision approach, or, when applicable, a circling maneuver from an instrument approach procedure.	Add 400 ft to the MDA(H) or DA(H), as applicable.	Add 1 sm or 1600m to the landing minimum.
For airports with at least two operational navigational facilities, each providing a straight-in approach procedure to different suitable runways.	Add 200 ft to the higher DA(H) or MDA(H) of the two approaches used.	Add ½ sm or 800m ⁴ to the higher authorized landing minimum of the two approaches used.
One useable authorized Category II ILS IAP.	300 feet	¾ sm (1200 m) or RVR 4000 (1200 m)
One useable authorized category III ILS Instrument Approach Procedure (IAP).	200 feet	1/2 sm (800 m) ⁴ or RVR 1800 feet (550 m)

¹ When determining the usability of an IAP, wind plus gust must be forecast to be within operating limits, including reduced visibility limits, and should be within the

manufacturer's maximum demonstrated crosswind value.

² Conditional forecast elements need not be considered, except that a PROB40 or TEMPO condition below the lowest applicable operating minima must be taken into account.

³ When dispatching under the provisions of the MEL, those MEL limitations affecting instrument approach minima must be considered in determining ETOPS alternate minima.

⁴ For operations outside RoI, because of variations in the international metric weather forecasting standards, 700m may be used in lieu of 800m.

6) Fuel Supply. The certificate holder must comply with the ETOPS en route fuel supply as specified in section 121.646(b) as follows:

- a) No person may dispatch or release for flight or takeoff a turbine engine-powered airplane in ETOPS unless, considering wind and other weather conditions expected, it has the fuel required by normal Flag or supplemental carrier requirements and enough fuel to satisfy paragraphs 1 through 4 below:
 1. The greater amount of fuel sufficient to fly to an ETOPS alternate under the following three scenarios:
 - Assuming a rapid decompression at the most critical point followed by descent to a safe altitude in compliance with the oxygen supply requirements of section 121.333, or
 - At the approved one-engine inoperative cruise speed assuming a rapid decompression and a simultaneous engine failure at the most critical point followed by descent to a safe altitude in compliance with the oxygen supply requirements of section 121.333, or
 - At the approved one-engine inoperative cruise speed assuming an engine failure at the most critical point followed by descent to the one-engine inoperative cruise altitude.
 2. Upon reaching the alternate, hold at 1,500 ft above field elevation for 15 minutes and then conduct an instrument approach and land.
 3. Add a 5 percent wind speed factor (that is, an increment to headwind or a decrement to tailwind) on to the actual forecast wind used to calculate fuel in paragraph 1 above to account for any potential errors in wind forecasting. If a certificate holder is not using the actual forecast wind based on a wind model acceptable to the DGCA, the airplane must carry 5 percent of the fuel required for paragraph 1 above, as reserve fuel to allow for errors in wind data. A wind aloft forecast distributed worldwide by the World Area Forecast System (WAFS) is an example of a wind model acceptable to the DGCA.
 4. After completing the calculation in paragraph 3, compensate in paragraph 1 above with additional fuel for the greater of the following scenarios:
 - The effect of airframe icing during 10 percent of the time during which icing is forecast (including ice accumulation on unprotected surfaces,

and the fuel used by engine and wing anti-ice during this period). Unless a reliable icing forecast is available, icing may be presumed to occur when the total air temperature at the approved one-engine cruise speed is less than +10 degrees Celsius, or if the outside air temperature is between 0 degrees Celsius and -20 degrees Celsius with a relative humidity of 55 percent or greater

- Fuel for engine anti-ice, and if appropriate wing anti-ice, for the entire time during which icing is forecast
- b) Unless the certificate holder has a program established to monitor airplane in-service deterioration in cruise fuel burn performance, and includes in fuel supply calculations fuel sufficient to compensate for any such deterioration, increase the final calculated fuel supply by 5 percent to account for deterioration in cruise fuel burn performance.
- c) If the APU is a required power source, then its fuel consumption must be accounted for during the appropriate phases of flight.
- d) In computing the ETOPS alternate fuel supply, advantage may be taken of driftdown computed at the approved one-engine inoperative cruise speed. Accounting of wing anti-ice as in paragraph (6)(a)4 above may apply to some models of airplane based on their characteristics and the manufacturer's recommended procedures.
- 7) Communications.** The DGCA has determined that the best way to assure clear and timely communication in general, is via voice communication. Likewise the DGCA has determined that there is a significant safety benefit associated with an ETOPS flight having the ability to communicate via a satellite based voice system, especially for those situations that occur while on long, remote ETOPS routes. The need for safety is best served through information and technical assistance that is clearly and rapidly transmitted to the flightcrew in a way that requires the least amount of distraction to piloting duties. Other than the area north of 82 degrees latitude, satellite communications provides the best means to provide that capability because it is not limited by distance. The DGCA recognizes the limitations of satellite communications (SATCOM) in the North Polar Area above this latitude, and in such an area an alternate communication system such as HF voice or data link is to be used. The relatively short period of time that the flight is above latitude 82 degrees North in relation to the total planned flight time is a small fraction of the total flight. The ability to use SATCOM for all other portions of the flight, which for some routes could be longer than 15 hours duration, is advantageous to the flight. For flights above 82 degrees North latitude, the operator must also ensure that communications requirements can be met by the most reliable means available, taking into account the potential communication disruption due to solar flare activity. The same philosophy and commensurate requirements apply for ETOPS in the South Polar Area.
- a) Section 121.99(a) includes a requirement for communications facilities that

- enable rapid and reliable communications on routes and altitudes that may be used. For all ETOPS each certificate holder conducting flag or supplemental operations in ETOPS must provide voice communications over routes where voice communications facilities are available. Where voice communication facilities are not available, and voice communication is not possible or is of poor quality, communications using alternative systems must be substituted.
- b) In addition to the communication requirement above, flag and supplemental certificate holders operating ETOPS beyond 180 minutes from an alternate must have a second communications system that is capable of providing immediate satellite-based voice communications of landline telephone fidelity such as SATCOM. This system must be capable of providing clear voice communications between the flight crewmember and ATC, and the flight crewmember and operations (dispatch). Where clear satellite-based voice communications are not available, alternative communications systems must be substituted. If an operator has provided a satellite communication system for the crew to satisfy section 121.99(a), it is not necessary that the second communication system required for ETOPS beyond 180 minutes be satellite based.
 - c) In determining whether such communications requirements discussed in paragraphs (a) and (b) above are available, the certificate holder must consider potential routes and altitudes needed for possible diversions to ETOPS alternates as well as the original planned routing.

8) Dispatch/Flight Release.

- a) The following items must be listed in the dispatch or flight release for all ETOPS in accordance with section 121.687.
 - ETOPS alternates; and
 - The authorized ETOPS diversion time under which the flight is dispatched or released.
- b) The pilot in command (PIC) should have access to the weather and status of services and facilities at all adequate airports with weather greater than approach minimums other than the designated ETOPS alternates along the planned route that could be used for diversion before accepting the flight release.
- c) If a flight is dispatched on a route that is greater than 180 minutes from an ETOPS alternate, the certificate holder must inform the flightcrew and give them the reason for the routes selection.

9) Dispatch on a "Flight-by-Flight Exception" Basis.

For two-engine airplane ETOPS approvals under the provisions of 207-minute ETOPS in the North Pacific Area of Operation, and 240-minute ETOPS in the North Polar Area, in the area north of the NOPAC area, and the Pacific Ocean area north

of the equator, regulations limit the operator's use of this authority in these areas to an "exception" basis. This exception may only be used when an ETOPS alternate is not available within 180 minutes and is based on certain criteria.

- a) For 207-Minute ETOPS, exception criteria includes political or military concerns, volcanic activity, temporary airport conditions, and airport weather below dispatch requirements, or other weather related events.
- b) For 240-Minute ETOPS in the North Polar Area and in the Area North of NOPAC, exception criteria includes extreme conditions particular to these areas such as volcanic activity, extreme cold weather at en route airports airport, weather below dispatch requirements, temporary airport conditions and other weather related events. The certificate holder must establish the criteria to be used to decide what extreme weather precludes using an airport.
- c) For 240-Minute ETOPS in the Pacific Ocean Area north of the Equator, exception criteria includes political or military concern, volcanic activity, airport weather below dispatch requirements, temporary airport conditions and other weather related events.

NOTE: Certificate holders are required to maintain a record of their use of that authority for tracking purposes. When an operator is granted such authority, they may exercise this authority based on the conditions above without limit. There is currently no requirement for any specific format for reporting 207- and 240-minute track usage.

d. En Route.

- 1) **PIC Authority.** No part of this AC is to be interpreted as reducing the PIC' s joint responsibility for determining that the flight can be safely conducted as planned before release. None of the guidance in this AC may be interpreted in any way to prejudice or limit the final authority and responsibility of the PIC for the safe operation of the airplane.
- 2) **Potential Diversion Airports after Departure.**
 - a) After departure, designated ETOPS alternates must continue to meet the requirements of original dispatch, except that the weather must remain at, or above, operating minima (section 121.631(c)). The pilot and dispatcher should monitor the airports within the ETOPS area of operation that could be used for diversion for deterioration in the weather and limitations in the availability of facilities and services that would render an airport unsuitable for landing in the event of a diversion. During the course of the flight, the flight crewmembers should be informed of significant changes in conditions at the designated ETOPS alternates, particularly those conditions that would render an airport unsuitable for landing and improvement in airport weather to conditions above operating minima.
 - b) In most ETOPS operations, the ETOPS entry point is a significant distance from the point of dispatch. To ensure the capability and availability of an en

route alternate to support any en route contingencies, before an ETOPS flight proceeds beyond the ETOPS entry point, the certificate holder must evaluate the weather from the earliest to latest time of arrival at the designated ETOPS alternates, as well as the landing distances, airport services, and facilities. If any conditions, such as weather below landing minima, are identified that would preclude a safe approach and landing, the PIC should be notified and an additional ETOPS alternate selected where a safe approach and landing can be made. A revised flight plan should include information on the newly designated ETOPS alternates within the authorized area of operation. Information on the weather and capabilities (that is, emergency response, approach aids, navigation facilities, and airport infrastructure) of potential ETOPS alternates in the authorized area of operations should be available to the PIC. The maximum diversion time, determined by the newly selected ETOPS alternate, must not exceed the authorized ETOPS maximum diversion time listed in the certificate holder's OpSpec for that airplane and operating area that could have been applied at original dispatch.

- c) An operator is not required to turn back once the flight has gone beyond the ETOPS entry point if an unexpected worsening of the weather at the designated ETOPS alternate airport drops the airport below operating landing minima (or any other event occurs that makes the runway at that airport unusable). The DGCA requires that the PIC, in coordination with the dispatcher if appropriate, will exercise judgment in evaluating the situation and make a decision as to the safest course of action. This may be a turn back, re-routing to another ETOPS alternate airport, or continuing on the planned route. Should the operator become aware of a potential weather problem prior to the airplane entering the ETOPS stage of the flight, the rule allows the operator to designate a different alternate airport at the ETOPS entry point in order to continue the flight.

3) Engine Failure.

- a) Section 121.565 requires the PIC of a two-engine airplane with one engine inoperative to land at the nearest suitable airport where, in the PIC's judgment after considering all relevant factors, a safe landing can be made. This determination is especially critical for ETOPS where the availability of suitable airports may be limited and the diversion decision is therefore more critical. The following is a list of some, but not all, factors that may be relevant in determining whether or not an airport is suitable, and are consistent with the ETOPS principle of protecting the diversion once it occurs:
- Airplane configuration, weight, systems status, and fuel remaining;
 - Wind and weather conditions en route at the diversion altitude;
 - Minimum altitudes en route to the diversion airport;
 - Fuel burn to the diversion airport;
 - Airport's nearby terrain, weather, and wind;
 - Availability and surface condition of runway;
 - Approach navigation aids and lighting available;

- Rescue and fire fighting services (RFFS) at the diversion airport;
 - Facilities for passenger and crewmember disembarkation, and accommodations;
 - PIC's familiarity with the airport; and
 - Information about the airport provided to the PIC by the certificate holder.
- b) When operating a two-engine airplane with one engine inoperative, none of the following factors should be considered sufficient justification to fly beyond the nearest suitable airport:
- The fuel supply is sufficient to fly beyond the nearest suitable airport;
 - Passenger accommodation other than passenger safety; and
 - Availability of maintenance and/or repair resources.
- c) If no more than one engine is shut down on an airplane that has three or more engines, section 121.565 permits the PIC to fly beyond the nearest suitable airport in point of time if the PIC determines that doing so is as safe as landing at the nearest suitable airport. In making a decision to fly beyond the nearest suitable airport, the PIC should consider all relevant factors and, in addition, consider the possible difficulties that may occur if the flight is continued beyond the nearest suitable airport. When an airplane with more than two engines bypasses a suitable alternate, the PIC should carefully weigh the risk associated with the next possible failure, which could complicate 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 crew workload and their possible success in completing the associated abnormal approach and landing procedures. It is even possible that a contingency outside of the realm of a system failure, such as a passenger illness, could compound the crew's workload normally associated with the current failure condition.

4) System Failure/Partial Failure.

- a) During ETOPS, the limited availability of diversion airports and extended diversion distances require that the impact of a system failure or partial failure be carefully evaluated. This should include a careful assessment of remaining systems and overall operational capability. Time permitting, full use should be made of the information available through the certificate holder's dispatch facility and a determination made by the PIC as to the plan for the safe continuation of the flight, that is whether it is safer to divert and land or to continue as planned under the circumstances.
- b) If, as a result of reevaluating airplane systems, a change in flight plan is required, the PIC should be provided revised flight plan information and an update of conditions, including weather conditions at designated ETOPS alternates. Dispatch should advise the flight crewmembers of additional airports on the planned route of flight that could be used for diversion. In no case may the maximum approved diversion authority of the operation be exceeded.

- 5) Other Diversion Scenarios.** During ETOPS an airplane may divert for reasons other than engine or systems failure such as medical emergencies, onboard fire, or decompression. The nature of the emergency, and its possible consequences to the airplane, passengers and crew, will dictate the best course of action suitable to the specific en route contingency. The flightcrew must decide on the best course of action based on all available information. The ETOPS Alternate Airports required by section 121.624 and designated for a particular flight provide one option to the PIC. However, these ETOPS alternates may not be the only airports available for the diversion and nothing in this guidance in any way limits the authority of the PIC.

e. ETOPS Procedures Documentation.

- 1) The certificate holder should develop unique ETOPS flightcrew procedures for each of the flight operations requirements discussed in this section. These procedures should be contained in the applicable manual or information provided to the flightcrew. The manual or information provided to the flightcrew should also contain procedural information necessary to interface with ETOPS maintenance requirements such as;
 - Fuel crossfeed valve operational check (if applicable);
 - Special ETOPS MEL requirements ;
 - APU in-flight start procedures (if applicable);
 - Engine Condition Monitoring (ECM) data recording procedures; and
 - In-flight verification of ETOPS significant systems.
- 2) The initial pilot flight manual ETOPS section and each revision must be submitted to the DGCA and approved before being adopted.

304. FLIGHT OPERATIONS TRAINING REQUIREMENTS.

a. ETOPS Unique Requirements.

The certificate holder's approved training program for ETOPS should include training that describes the unique aspects of ETOPS. That training should include, but not be limited to:

- 1) **Diversion Decision Making.** The certificate holder's training program should prepare flight crewmembers to evaluate probable propulsion and airframe systems malfunctions and failures. The goal of this training should be to establish flight crewmember competency in dealing with the most probable operating contingencies.
- 2) **Specific ETOPS Requirements.** The certificate holder's ETOPS training program should provide and integrate training for flight crewmembers and dispatchers (if applicable), in accordance with CASR 121 Appendix C point (h). The DGCA will periodically evaluate a cross-section of those items.

- 3) **Passenger Recovery Plan.** The certificate holder must provide training to the flight crewmembers and dispatchers relative to their perspective roles in the certificate holder's passenger recovery plan.

b. Check Airman Used in ETOPS.

The certificate holder must designate check airmen specifically for ETOPS. The objective of the ETOPS check airman program should be to ensure standardized flight crewmember practices and procedures and also to emphasize the special nature of ETOPS. Only airmen with a demonstrated understanding of the unique requirements of ETOPS should be designated as a check airman.

c. Review of Training Programs and Operating Manuals.

- 1) The purpose of the review is to verify the adequacy of information provided to training programs and operating manuals. The DGCA will use the information resulting from these reviews as the basis for modification or updating flight crewmember training programs, operating manuals, and checklists, as necessary.
- 2) The DGCA will also continually review in-service experience of systems significant to ETOPS. The review includes system reliability levels and individual event circumstances, including crewmember actions taken in response to equipment failures or loss of capabilities.

CHAPTER 4. APPLICATIONS TO CONDUCT ETOPS

400. ETOPS QUALIFICATIONS.

The unique nature of ETOPS necessitates an evaluation of these operations to ensure that the certificate holder's proposed programs are effective. The DGCA will review the certificate holder's documentation and training programs to validate that they are appropriate for ETOPS. To receive approval to conduct ETOPS the certificate holder must satisfy the following conditions:

a. Airplane.

The specified airplane-engine combination listed in the certificate holder's application must have been certificated to the airworthiness standards of transport category airplanes and must be approved for ETOPS as required by section 121.162.

b. Flight Operations and Maintenance Requirements.

The certificate holder must show compliance with the flight operations requirements discussed in paragraph 303 and the maintenance requirements discussed in paragraph 301.

c. Training Requirements.

The certificate holder should show that it has trained its personnel to achieve competency in ETOPS and must show compliance with the flight operations and maintenance training requirements discussed in paragraphs 302 and 304.

d. Requirements For ETOPS Approval.

Before the DGCA grants ETOPS operational approval to an applicant for two-engine ETOPS, the certificate holder must be able to demonstrate the ability to achieve and maintain the level of propulsion system reliability that is required for the ETOPS-approved airplane-engine combination to be used (appendix P to part 121, section I, paragraph (a)). The certificate holder must also demonstrate that it can operate the particular airframe and other airplane systems at levels of reliability appropriate for the intended operation. This can be achieved directly by a successful in-service operational history or by successfully validating all the required ETOPS processes according to the Accelerated ETOPS Application Method in Appendix 3 of this AC.

e. Accelerated ETOPS Application.

An applicant for an initial operating certificate who is applying for ETOPS authority at entry into service under the Accelerated ETOPS Application method must comply with the same requirements for certificate holders outlined in this AC. It should be understood that validation of an applicant with no previous operational experience should be more robust than would be necessary for a certificate holder with operational experience. As is the case for all Accelerated ETOPS approvals, the DGCA must be satisfied that the applicant can operate to the standards expected of an experienced ETOPS operator from the first day of service.

401. APPLICATION FOR ETOPS AUTHORIZATION.

- a. Any certificate holder wishing to obtain an ETOPS authorization must submit an application with all supporting data to the DGCA. This application will be for a specific airplane-engine combination and should address all the regulatory requirements for ETOPS. The certificate holder may follow the guidance found in this AC to complete the application. The application should be submitted at least 60 days prior (6 months for the Accelerated ETOPS method of application) to the proposed start of extended range operation with the specific airplane-engine combination.
- b. Two-Engine Airplanes.**
- 1) **Up to 180-Minute ETOPS.** An applicant requesting ETOPS up to 180 minutes for two-engine operations may select one of the following two application methods best suited to their proposed operation (See Appendix 3):
 - a) In-service experience method, or
 - b) Accelerated ETOPS method.
 - 2) **ETOPS Beyond 180 Minutes, up to and Including 240 Minutes.** The DGCA grants approval for ETOPS beyond 180 minutes only to certificate holders with existing 180-minute ETOPS operating authority for the airplane-engine combination to be operated in the application. There is no minimum in-service time requirement for the 180-minute ETOPS operator requesting ETOPS approval beyond 180 minutes.
 - 3) **ETOPS Beyond 240 Minutes.** This authority is only granted to operators of two-engine airplanes between specific city pairs. The certificate holder must have been operating at 180 minute or greater ETOPS authority for at least 24-consecutive months, of which at least 12-consecutive months must be at 240-minute ETOPS authority with the airplane-engine combination in the application.
- c. Passenger-Carrying Airplanes with More than Two Engines.** There are no minimum in-service experience criteria for certificate holders requesting ETOPS beyond 180 minutes for operations with more than two engines. Those applicants will request approval under the accelerated ETOPS method.

402. ETOPS AUTHORITIES.

- a. **ETOPS with Two—Engine Airplanes.** An applicant for two-engine ETOPS may seek approval for extended operations by seeking one of the following ETOPS approvals best suited to their proposed operations (see Appendix 2):
- 1) 75-minute ETOPS in the Caribbean/Western Atlantic Area or in other areas.
 - 2) 90-minute ETOPS in Micronesia.
 - 3) 120-minute ETOPS.
 - 4) 138-minute ETOPS. Such approvals are granted to current 180-minute ETOPS operators, or as an extension of authority to operators with only 120-minute

ETOPS approval.

- 5) 180-minute ETOPS.
- 6) 207-minute ETOPS in the North Pacific Area of Operation.
- 7) 240-minute ETOPS. Approvals are granted at this level based on the particular geographic area applied for with criteria delineated for particular applications.
- 8) Beyond 240-minute ETOPS. Approvals are granted at this level based on particular city pairs.

b. ETOPS with Passenger-Carrying Airplanes having More than Two Engines.

Certificate holders applying for ETOPS with passenger-carrying airplanes that have more than two engines will receive ETOPS authority based on the DGCA-approved maximum time limited airplane system restriction of the airplane-engine combination listed in their application and the maximum authority requested.

403. ETOPS AUTHORIZATION REQUIREMENTS.

- a. All certificate holders of airplanes with two engines, and all certificate holders of passenger-carrying airplanes with more than two engines, operating on ETOPS routes must comply with all the operational and process requirements specified in the ETOPS regulations in part 121 and as discussed in this AC.
- b. Those certificate holders operating airplanes with more than two engines who choose to follow the recommendations in this AC as a means of compliance with the operating rules, and who, on March 26, 2014, have the authority to operate on specific non-ETOPS routes that under the new definition are classified as ETOPS routes, are not required to re-apply for their specific route authority. However, from March 26, 2014, the certificate holder is required to comply with all the ETOPS flight operational requirements that are described in this AC and must have their ETOPS program and all ETOPS processes approved by DGCA. The DGCA will amend the certificate holder's ACL as the approval to conduct operations under section 121.161.
- c. All ETOPS certificate holders applying for approvals under this section must provide sufficient information with their application to the DGCA office on the following areas of concern in ETOPS:
 - 1) **ETOPS Area of Operations/Airplane Performance.** The altitudes and airspeeds used in establishing the ETOPS area of operations for each airplane-engine combination must be shown to permit compliance with the terrain and obstruction clearance requirements of section 121.191 and 121.193, as applicable. A speed other than the approved single engine speed may be used as the basis for compliance to section 121.191 and 121.193, provided fuel consumption is shown not to exceed the critical fuel scenario associated with the applicable ETOPS equal-time point (section 121.646), and the time limited system requirements of section 121.633 are not exceeded.
 - 2) **Weather Information System.** A certificate holder should substantiate that the weather information system that it uses can be relied on to forecast terminal and en

route weather with a reasonable degree of accuracy and reliability in the proposed areas of operation. Such factors as staffing, dispatcher, training, sources of weather reports and forecasts, and when possible, a record of forecast reliability, should be evaluated.

3) Minimum Equipment List. The certificate holder is required to submit its MEL, designed in accordance with the Master Minimum Equipment List (MMEL), appropriate to the requested level of ETOPS. A certificate holder's MEL may be more restrictive than the MMEL, considering the kind of ETOPS proposed and the equipment and service problems unique to the certificate holder. System redundancy levels appropriate to ETOPS should be reflected in the MMEL. Systems considered to have a fundamental influence on flight safety may include, but are not limited to the following:

- Electrical, including battery,
- 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, and
- Any other equipment necessary for ETOPS.

4) Public Protection. The provisions for public protection have historically been embedded in section 121.97(ii). Current requirements are found in section 121.97(b)(1)(ii). The definition of "public protection" has been expanded for certificate holders operating ETOPS beyond 180 minutes, and for operations in the North Polar Area and South Polar Area to include facilities at each airport, or in the immediate area, sufficient to protect the passengers and crew from the elements and to see to their welfare. Due to the nature of these operations and the climatic issues involved during the majority of the year, certificate holders undertaking these operations must ascertain that facilities at an airport, or in the immediate area, are sufficiently robust to protect the passengers and crew from the elements, and to see to their welfare during the time required to transport them towards their destination under the passenger recovery plan discussed in paragraph (5) below.

5) Passenger Recovery Plan.

- a) A specific passenger recovery plan is required for each ETOPS Alternate Airport used by a certificate holder in ETOPS greater than 180 minutes (ACL B042, ER—OPS En Route Alternate Airports). For operations in the

- North Polar Area and the South Polar Area a specific passenger recovery plan is required for each designated diversion airport taken from those listed in an operator's ACL for this operation (North and South Polar Areas, ACL paragraph B055, North Polar Operations [Sic], Polar Operations).
- b) The certificate holder's formal passenger recovery plan should provide a means to validate acceptable levels of infrastructure to provide for an orderly process for the care and well being of the passengers and crewmembers. This infrastructure should include facilities that provide for the physiological needs of the passengers and crewmembers such as continuing safety, food, and shelter. Any list of considerations for the passengers and crewmembers need not be exhaustive. However, in certain cases involving operations in demanding environments, plans may need to be detailed enough to provide for medical care, communications, methods for securing alternative expedited travel, extraction, and other continued travel provisions for the crewmembers and passengers. If the certificate holder proposes to use the airplane capabilities and services as a means to satisfy all or part of the requirements for such a plan, the time-limited capability of appropriate systems should be evaluated and taken into account.
 - c) It is generally accepted that any plan that is designed to fully recover the passengers within 48 hours may be viewed as meeting the overall requirement to provide for the care and safety of the passengers and crewmembers. The greatest concern relative to passenger recovery plans is when diversions occur to an airport that is geographically located within an area not normally served by the certificate holder and, more specifically, when the diversion occurs to an en route alternate airport located in a harsh operating environment. A certificate holder with a route system extending over remote areas of the world has a responsibility under the regulations (section 121.135), to develop a passenger recovery plan in anticipation of the possibility of a diversion to an approved en route alternate airport lying within those remote regions. In these instances, the certificate holder operating on those routes should devise a plan of substance that will outline how it will recover the passengers, crewmembers, and airplane in the event of such a diversion. This plan should be of sufficient detail to demonstrate that the recovery operation can be readily effected, and that the basic needs of the diverted passengers and crewmembers can be provided for in the interim. The plan should address all of the concerns previously listed with specific emphasis on any issues unique to that particular environment. In some environments provisions for shade from the direct sunlight and cooling may be a concern; while in other environments such as polar and sub-polar areas, plans should provide for immediate provisions for shelter from the elements, heating, and clothing. After these immediate concerns are addressed, the plan should address provisions for initiating extraction procedure immediately. In all cases a particular alternate airport environment should drive the requirements of the passenger recovery plan and the prioritization of concerns needing to be addressed.

- 6) Navigation.** The applicant must show the availability of navigation facilities adequate for the operation, taking into account the navigation equipment installed on the airplane, the navigation accuracy required for the planned route and altitude of flight, and the routes and altitudes to the airports designated as ETOPS alternates. Navigation facilities required to ensure a safe approach and landing must be available.

NOTE: Non-terrestrial approaches, e.g., GPS/RNAV, may be utilized if approved in a certificate holder's operating specifications.

- 7) Communications.** The certificate holder must show the availability of communications services and facilities for communication with ATC and the dispatch office. Certificate holders operating ETOPS routes must use the most reliable voice-based communications technology available for communications between the flightcrew and air traffic services, and the flightcrew and the certificate holder per section 121.99. For ETOPS routes further than 180 minutes from adequate airports, a second communication system is required and must be able to provide immediate satellite-based voice communications of landline-telephone fidelity. Rapid and reliable ATC communications are determined by the facilities operated by ATC units in the areas of operations.

NOTE: For ETOPS routes further than 180 minutes from adequate airports, only one of the two required communication systems must be SATCOM. The intent of section 121.99 is for the crew to have available immediate satellite-based voice communication of landline-telephone fidelity. If an aircraft is already equipped with a SATCOM system, the second communication system does not need to be SATCOM.

404. VALIDATION FLIGHT(S).

Prior to granting ETOPS approval to a certificate holder for operation of a specific airplane-engine combination in an authorized area of operation, the DGCA will require actual validation flights on proposed routes that the certificate holder intends to operate within the ETOPS area of operations, designated in the operator's approval request. This is to ensure that the ETOPS flight operations and maintenance programs described in Chapter 3 are capable of supporting those operations. Depending on the certificate holder's level of experience in conducting ETOPS and the routes intended to be used in operations, the DGCA will determine the number of validation flights required, the manner in which validation flights may be conducted (revenue with passengers, non-revenue, or cargo only), and any other items requiring validation. If approval is granted to fly the validation flight in revenue service, the operator should be granted appropriate, though temporary or restricted, ACL covering the necessary flight(s). At the successful conclusion of the validation, the DGCA amendment and issuance of unrestricted ACL. Certificate holders operating passenger-carrying airplanes with more than two engines who, on the effective date of this AC, have the authority to operate on specific non-ETOPS routes that under the new definition are classified as ETOPS routes, may not be required to conduct an actual

validation flight. If the certificate holder can adequately validate that the necessary additional ETOPS processes and procedures are in place, and that they can function appropriately, may be validate by another means satisfactory to the DGCA.

405. REQUIRED DEMONSTRATION ON A VALIDATION FLIGHT.

- a. The certificate holder should demonstrate, by means of an DGCA-witnessed validation flight or flights using the specified airplane-engine combination in its application, that it has the competence and capability to safely conduct and adequately support the intended operation. The DGCA will determine the conditions for each certificate holder's validation flights. This determination will be made on a case-by-case basis following a review of the certificate holder's experience and the proposed operation. This process may require the certificate holder to conduct an actual diversion during the validation flights.
- b. The following emergency conditions should be demonstrated during the ETOPS validation flights, unless successful demonstration of these conditions has been approved and subsequently witnessed by the DGCA in an acceptable simulation prior to the validation flight:
 - 1) Total loss of thrust of one engine and total loss of engine-generated (or normal) electrical power (as a minimum, the ETOPS critical electrical condition identified during ETOPS certification), or
 - 2) Any other condition considered more critical in terms of Airworthiness, crewmember workload, or performance risk.

This simulator demonstration does not alter the certificate holder's requirement to demonstrate the competence and the capability to adequately support the intended operation during the ETOPS validation flight.

CHAPTER 5. DGCA ETOPS APPROVAL

500. FINAL ETOPS OPERATING AUTHORITY.

Following completion of the ETOPS application requirements and before the issuance of ACL, the certificate holder's application with supporting data, should be forwarded to DGCA office, for review and concurrence. Following review and concurrence by DGCA, the validation flights should be conducted in accordance with any additional guidance or recommendations specified in the review and concurrence process. Following the successful completion of the validation flights, the DGCA will issue the certificate holder ACL for ETOPS operations.

501. ETOPS ACL.

Those ACL for ETOPS provide authorizations and limitations covering at least the following:

- a. Approved airplane-engine combinations,
- b. Current approved CMP standard required for ETOPS, if appropriate,
- c. Authorized geographic area(s) of operation,
- d. ETOPS area of operation,
- e. Airports authorized for use, including alternates and associated instrument approaches and operating minima,
- f. Approved maintenance and reliability program for ETOPS including those items specified in the type design approved CMP standard, if appropriate, and
- g. Identification of the airplanes authorized for ETOPS by make, model, serial, and registration number.

502. CHANGES TO APPROVED ETOPS OPERATIONS, MAINTENANCE AND TRAINING PROCEDURES.

Following final ETOPS approval, if a certificate holder determines a need to make substantial changes to its ETOPS operations, maintenance and training procedures, it should submit such changes in a timely manner to the DGCA for review and acceptance before incorporation. The certificate holder and the DGCA should negotiate what constitutes a substantial change to allow flexibility and take into consideration a certificate holder's ETOPS experience. What is considered substantial for a new entrant ETOPS certificate holder may be considerably different than for a certificate holder with many years of ETOPS experience.

503. PROCESSES AFTER RECEIVING ETOPS AUTHORITY.

- a. The DGCA continuously monitors the world fleet average IFSD rate for two-engine ETOPS authorized airplane-engine combinations to ensure that the levels of reliability achieved in ETOPS remain at the required levels. If an acceptable level of reliability in fleet average IFSD is not maintained, or if significant deficiencies or adverse trends are detected in type design (i.e., basic design of the airplane-engine) or in the operation, the DGCA may require the airframe and engine manufactures to develop a plan acceptable to the DGCA to address the deficiencies.
- b. As with all other operations, the DGCA will monitor all aspects of the ETOPS operations it has authorized to the certificate holder to ensure that the levels of reliability achieved in ETOPS operations remain at acceptable levels, and that the operation continues to be conducted safely.
- c. In the event that an acceptable level of reliability is not maintained, if significant adverse trends exist, or critical deficiencies are detected in the type design or in the conduct of ETOPS operations, the DGCA will evaluate problems associated with airplane design or operations are identified; and Initiate a special evaluation, impose operational restrictions (if necessary), and ensure that the certificate holder adopts corrective actions to resolve the problems in a timely manner.

CHAPTER 6. POLAR OPERATIONS

To Be Determined

APPENDIX 1. DEFINITIONS

The following definitions are applicable to ETOPS. They include definitions from CASR parts 1 and 121, as well as terms that are used within the context of this AC with respect to ETOPS:

- 1. Adequate Airport.** An airport that an airplane operator may list with approval from the DGCA because that airport meets the landing limitations of part 121, section 121.197 and is either, an airport that meets the requirements of CASR part 139 subpart D, excluding those that apply to aircraft rescue and firefighting service, or a military airport that is active and operational. Airports without specific part 139 approval (i.e., outside DGCA jurisdiction), may be considered adequate provided that they are determined to meet the equivalent standards and intent of part 139 subpart D.
- 2. Authorizations, Conditions, and Limitations (ACL).** A document issued by the DGCA to certificate holder specify the authorizations, conditions, and limitations under which each type of operation must be conducted and under which each class and size of aircraft must be operated.
- 3. Configuration, Maintenance, and Procedures (CMP) Document.** A document approved by the DGCA that contains minimum configuration, operating, and maintenance requirements, hardware life-limits, and Master Minimum Equipment List (MMEL) constraints necessary for an airplane-engine combination to meet ETOPS type design approval requirements.
- 4. Dual Maintenance.** Dual maintenance means maintenance on the "same" ETOPS significant system. Dual maintenance is maintenance action performed on the same element of identical, but separate ETOPS Significant Systems during a scheduled or unscheduled maintenance visit. Dual maintenance on "substantially similar" ETOPS significant systems means maintenance actions performed on engine-driven components on both engines during the same maintenance visit.
- 5. Equal-Time Point (ETP).** A point on the route of flight where the flight time, considering wind, to each of two selected airports is equal.
- 6. ER.** An abbreviation used in the MMEL and in the minimum equipment list (MEL) of some certificate holders to indicate ETOPS. As used in this AC, any ETOPS MMEL/MEL restrictions applicable to ETOPS.
- 7. ETOPS Alternate Airport.** An adequate airport listed in the certificate holder's operations specifications (ACL) that is designated in a dispatch or flight release for use in the event of a diversion during ETOPS. This definition applies to flight planning and does not in any way limit the authority of the pilot in command (PIC) during flight.
- 8. ETOPS Area of Operation.** For turbine-engine-powered airplanes with two engines an area beyond 60 minutes from an adequate airport, or with more than two engines in passenger-carrying operations, an area beyond 180 minutes from an adequate airport, and within the authorized ETOPS maximum diversion time approved for the operation being conducted. An ETOPS area of operation is calculated at an approved

one-engine inoperative cruise speed under standard conditions in still air.

9. **ETOPS Entry Point.** The first point on the route of an ETOPS flight; determined using a one-engine inoperative cruise speed under standard conditions in still air that is more than 60 minutes from an adequate airport for airplanes with two engines, and more than 180 minutes from an adequate airport for passenger-carrying airplanes with more than two engines.
10. **ETOPS Significant System.** An airplane system, including the propulsion system, the failure or malfunctioning of which could adversely affect the safety of an ETOPS flight, or the continued safe flight and landing of an airplane during an ETOPS diversion. Each ETOPS significant system is either an ETOPS Group 1 significant system or an ETOPS Group 2 significant system.
 - a. An ETOPS Group 1 Significant System:
 - 1) Has fail-safe characteristics directly linked to the degree of redundancy provided by the number of engines on the airplane;
 - 2) Is a system, the failure or malfunction of which could result in an in-flight shutdown (IFSD), loss of thrust control, or other power loss;
 - 3) Contributes significantly to the safety of an ETOPS diversion by providing additional redundancy for any system power source lost as a result of an inoperative engine; and
 - 4) Is essential for prolonged operation of an airplane at engine inoperative altitudes.
 - b. An ETOPS Group 2 significant system is an ETOPS significant system that is not an ETOPS Group 1 significant system. Group 2 system failures will not cause aircraft flight performance loss or cabin environment problems but may result in diversions or turn backs.
11. **ETOPS-Qualified Personnel.** A person performing maintenance for the certificate holder, who has satisfactorily completed the certificate holder's ETOPS qualification program.
12. **ETOPS.** An airplane flight operation during which a portion of the flight is conducted beyond 60 minutes from an adequate airport for turbine-engine-powered airplanes with two engines, and beyond 180 minutes for turbine-engine-powered passenger-carrying airplanes with more than two engines. This distance is determined using an approved one-engine inoperative cruise speed under standard atmospheric conditions in still air.
13. **Flight-by-Flight Exception.** The application of a greater ETOPS maximum diversion authority under specific, limited circumstances, as defined in this AC, when a flight cannot be planned on the preferred route within an authorized lesser diversion time.
14. **In-Flight Shutdown (IFSD).** When an engine ceases to function (when the airplane is airborne) and is shut down, whether self induced, flightcrew initiated or caused by an external influence. The DGCA considers IFSD for all causes, such as flameout, internal failure, flight crew initiated shutdown, foreign object ingestion, icing, inability to obtain or control desired thrust or power, and cycling of the start control; however briefly, even if the engine operates normally for the remainder of the flight. This definition excludes

the airborne cessation of the functioning of an engine when immediately followed by an automatic engine relight and when an engine does not achieve desired thrust or power but is not shut down.

15. Maximum Diversion Time. For the purposes of ETOPS in section 121.161 and related ETOPS regulations, maximum diversion time (for example 120 minutes, 180 minutes, 240 minutes, and, beyond 240 minutes) is the longest diversion time authorized for a flight under the operator's ETOPS authority. It is calculated under standard conditions in still air at a one-engine inoperative cruise speed.

16. One-Engine Inoperative Cruise Speed. For the purposes of those sections of part 121 applicable to ETOPS, the one-engine inoperative cruise speed is a speed within the certified operating limits of the airplane that is specified by the certificate holder and approved by the DGCA for calculating required fuel reserves needed to account for an inoperative engine, or determining whether an ETOPS alternate is within the maximum diversion time authorized for an ETOPS flight.

NOTE: The following areas (16-18) are defined for the purposes of those sections of part 121 applicable to ETOPS.

17. North Pacific (NOPAC). The North Pacific Air Traffic Service (ATS) routes and adjacent airspace between Anchorage and Tokyo Flight Information Regions (FIR).

18. North Pacific Area of Operations. Pacific Ocean areas north of 40° North latitudes including NOPAC ATS routes, and published Pacific Organized Track System (PACOTS) tracks between Japan and North America. (For the purposes of this definition, "North America" includes the countries of Canada, the United State, and Mexico.)

19. Polar Areas.

North Polar Area. The entire area north of 78° North latitude.

South Polar Area. The entire area south of 60° South latitude.

20. Process. A series of steps or activities that are accomplished in a consistent manner to ensure a desired result is attained on an ongoing basis.

21. Proven Process. A process is considered to be proven when the following elements are developed and implemented:

- a. Definition and documentation of process elements.
- b. Definition of process related roles and responsibilities.
- c. Procedures for validation of process or process elements to include:
 - Indications of process stability/reliability;
 - Parameters to validate process and monitor (measure) success; and
 - Duration of necessary evaluation to validate process.
- d. Procedure for follow-up in-service monitoring to assure the process remains reliable and stable.

APPENDIX 2. ETOPS APPROVALS

As described in Section 401 of this AC, appendix P to part 121 permits certificate holders to seek various levels of ETOPS approvals. This Appendix summarizes the details for each approval level, and is intended to provide further guidance to the requirements in appendix P to part 121.

1) Airplanes with Two Engines

Approval Level	Area of Applicability	Requirements	How to apply	Comments
75 minutes	Caribbean 1 Western Atlantic Area	<p>The airplane-engine combination need not be type design approved for ETOPS.</p> <p>The DGCA reviews the airframe-engine combination to ensure the absence of factors that could prevent safe operations.</p> <p>The airframe-engine combination must have sufficient favorable experience to demonstrate to the Administrator a level of reliability appropriate for 75-minute ETOPS.</p> <p>Even though there is no requirement for the type design approval of the airplane, the certificate holder must ensure the airplane has systems that are capable of complying with the requirements of section 121.633 for time-limited system planning.</p> <p>The certificate holder must comply with the maintenance program requirements of section 121.374, except that a pre-departure service check before departure of the return flight is not required. Guidance is provided in Chapter 3, paragraphs 301 and 302 of this AC.</p> <p>The certificate holder must comply with the flight operational requirement in part 121, as described in Chapter 3, paragraphs 303 and 304 of this AC.</p> <p>The certificate holder need not comply with 120-minute ETOPS provisions of the MMEL. The certificate holder must operate in accordance with the ETOPS authority as contained in its operations specifications (OpSpecs) and ACL.</p>	<p>Request made to the DGCA for route authority. The application will show the need for such an authority. Minimal or no in-service experience with the airplane-engine combination is required (see Appendix 3).</p>	<p>This area is considered a "benign" area of operations due to</p> <p>(1) numerous airports, (2) a high level of reliability and availability are required of communications, navigation, and ATC services and facilities, and (3) prevailing weather conditions that are stable and generally do not approach extremes in temperature, wind, ceiling, and visibility.</p>

Approval Level	Area of Applicability	Requirements	How to apply	Comments
75 minutes	Other areas besides Caribbean / Western Atlantic Area operations	<p>The airplane-engine combination need not be type design approved for ETOPS.</p> <p>The DGCA reviews the airframe-engine combination to ensure the absence of factors that could prevent safe operations.</p> <p>The airframe-engine combination must have sufficient favorable experience to demonstrate to the Administrator a level of reliability appropriate for 75-minute ETOPS.</p> <p>Even though there is no specific requirement for type design approval of the airplane, the certificate holder must ensure the airplane has systems that are capable of complying with the requirements of section 121.633 for time-limited system planning.</p> <p>The certificate holder must comply with the maintenance program requirements of section 121.374. Guidance is provided in Chapter 3, paragraphs 301 and 302 of this AC.</p> <p>The certificate holder must comply with the flight operational requirements in part 121, as described in Chapter 3, paragraphs 303 and 304 of this AC.</p> <p>The certificate holder must comply with 120-minutes ETOPS provisions in the MMEL.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	Request made to the DGCA for route authority. The application will show the need for such an authority.	Areas not considered benign such as North Atlantic (NAT/NMPS) area. Minimal or no in-service experience with the airplane-engine combination is required (see Appendix 3).
90 minutes	Micronesia	<p>The airplane-engine combination must be type design approved for 120-minutes ETOPS or greater.</p> <p>The certificate holder must comply with the maintenance program requirements of section 121.374, except that a pre-departure service check before departure of the return flight is not required. Guidance is provided in Chapter 3, paragraph 301 and 302 of this AC.</p> <p>The certificate holder must comply with the flight operational requirement in part 121, as described in chapter 3, paragraphs 303 and 304 of this AC.</p> <p>The certificate holder must comply with 120-minutes ETOPS provisions in the MMEL.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	Request made to the DGCA for route authority. The application will show the need for such an authority.	Minimal or no in-service experience with the airplane-engine combination is required (see Appendix 3).

Approval Level	Area of Applicability	Requirements	How to apply	Comments
120 minutes	Unlimited (no area restriction)	<p>The airplane-engine combination must be ETOPS type design approved for 120 minutes or greater.</p> <p>The certificate holder must comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as discussed in Chapter 3 of this AC. 3. The certificate holder must comply with 120-minute ETOPS provisions in the MMEL.</p> <p>4. The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	Chapter 4, paragraph 401(b) of this AC provides the two methods for gaining approval	
138 minute (for certificate holders who are currently approved for 120-minute ETOPS)	Unlimited (no area restriction)	<p>The airplane-engine combination must be ETOPS type design approved for 120-minute or greater. If approved only up to 120 minute, the DGCA must ensure the airplane time-limited systems support operations up to 138 minute in accordance with section 121.633.</p> <p>Comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as discussed in Chapter 3 of this AC. The certificate holder must conduct training for maintenance, dispatch and flightcrew. Training should include any unique aspects of 138 minute operations e.g., any additional requirement imposed by the DGCA including MEL requirements.</p> <p>Must comply with the "beyond 120-minute ETOPS provisions in the MMEL. If a 180-minute ETOPS MMEL does not exist for the airplane, the certificate holder must apply to the DGCA for any additional items that may be applicable for 138-minute operations.</p> <p>138-minute ETOPS authority is used when the route cannot be efficiently operated under 120-minute ETOPS.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	Certificate holder with 120-minute ETOPS authority may apply to the DGCA. The application will show the need for such an authority. A modified MEL to support operations should be submitted with the application to DGCA.	This is an extension of previous 120-minute authority. Approval is granted for operations up to 138 minutes on a flight-by-flight exception basis.
138 minute (for certificate holders who are currently approved for 120-minute ETOPS)	Unlimited (no area restriction)	<p>Airplane-engine combination must be ETOPS type design approved for 180 minutes or greater.</p> <p>Comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as discussed in Chapter 3 of this AC.</p> <p>Must comply with the 180-minute ETOPS provisions in the MMEL.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its operations specifications.</p> <p>The certificate holder must conduct training for maintenance, dispatch and flightcrew regarding the differences between 138-minute and 180-minute diversion authority.</p>	Certificate holder with 180-minute ETOPS authority may apply to the DGCA. The application will show the need for such an authority.	Since this authority is less than the certificate holder's maximum ETOPS authority, it may be exercised on an unlimited basis.

Approval Level	Area of Applicability	Requirements	How to apply	Comments
180 minute	Unlimited (no area restriction)	<p>Airplane-engine combination must be ETOPS type design approved for 180-minute or greater.</p> <p>Comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as discussed in Chapter 3 of this AC.</p> <p>Must comply with the 180-minute ETOPS provisions in the MMEL.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	Chapter 4, paragraph 401(b) of this AC provides the methods for gaining approval to operate under 180 minute	
207 minute	In North Pacific Area of Operations (Pacific Ocean areas north of 40N latitudes including NOPAC ATS routes and published PACOTS tracks between Japan and North America). The subcontinent of North America includes Canada, Mexico and the United States.	<p>Airplane-engine combination must be ETOPS type design approved for 180 minutes or more. The certificate holder must comply with section 121.633(a), however, the approved time for the airplane's most limiting ETOPS significant system and most limiting cargo-fire suppression time must be at least 222 minutes.</p> <p>Certificate holder must have existing 180-minute ETOPS operating authority for the airplane-engine combination to be operated.</p> <p>The certificate holder must have previous ETOPS experience satisfactory to the Administrator.</p> <p>The certificate holder must make every effort to plan ETOPS within 180 minutes or less, if possible.</p> <p>The certificate holder must inform the flightcrew each time an airplane is proposed for dispatch for greater than 180 minutes and tell them why the route was selected.</p> <p>In addition to the equipment specified in the certificate holder's minimum equipment list for 180-minute ETOPS, the following systems must be operational for dispatch:</p> <ul style="list-style-type: none"> The fuel quantity indicating system, The APU (including electrical and pneumatic supply and operating to the APU's designed capability) when the APU is necessary for an airplane to comply with ETOPS requirements, The auto throttle system, The communication system required by section 121.99(d) or section 121.122(c), as applicable, and One-engine inoperative auto-land capability, if flight planning is predicated on its use. Comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as discussed in Chapter 3 of this AC. <p>The nearest available ETOPS alternate within 207-minutes diversion time must be specified in the dispatch or flight release.</p> <p>In conducting such a flight the certificate holder must consider Air Traffic</p>	Those certificate holders that have 180-minute ETOPS authority in this area can apply to the DGCA for approval as an extension to their 180-minute authority.	This is an extension of 180-minute ETOPS authority for the specific case of operations in the North Pacific Area of Operations.

Approval Level	Area of Applicability	Requirements	How to apply	Comments
		<p>Service's preferred track.</p> <p>This exception may be used only on a flight-by-flight basis when an ETOPS alternate is not available within 180 minutes for reasons such as political or military concerns; volcanic activity; temporary airport conditions; and airport weather below dispatch requirements or other weather related events.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its operations specifications and ACL.</p> <p>The certificate holder must track how many times 207-minute authority is used.</p>		
<p>240 minute</p>	<p>North Polar Area, in the area north of the NOPAC, and in the Pacific Ocean north of the equator</p>	<p>Airplane-engine combination must be ETOPS type design approved for greater than 180 minutes. The certificate holder must ensure the airplane has systems that are capable of complying with the requirements of section 121.633(b) for time-limited system planning.</p> <p>Certificate holder must have existing 180-minute ETOPS operating authority for the airplane-engine combination to be operated.</p> <p>The certificate holder must have previous ETOPS experience satisfactory to the Administrator.</p> <p>The certificate holder must make every effort to plan ETOPS with 180 minutes or less, if possible.</p> <p>The certificate holder must inform the flightcrew each time an airplane is proposed for dispatch for greater than 180 minutes and tell them why the route was selected.</p> <p>In addition to the equipment specified in the certificate holder's minimum equipment list for 180-minute ETOPS, the following systems must be operational for dispatch:</p> <p>The fuel quantity indicating system,</p> <p>The APU (including electrical and pneumatic supply and operating to the APU's designed capability) when the APU is necessary for an airplane to comply with ETOPS requirements, The auto throttle system,</p> <p>The communication system required by section 121.99(d) or section 121.122(c), as applicable, and One-engine inoperative auto-land capability, if flight planning is predicated on its use.</p> <p>Comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as provided in Chapter 3 of this AC.</p>	<p>Those certificate holders that have 180-minute ETOPS authority in this area can apply to the DGCA for approval as an extension to their 180-minute authority.</p>	<p>This is an extension of 180-minute ETOPS in this area and is to be used on a flight by flight exception basis when an ETOPS alternate is not available within 180 minutes.</p>

Approval Level	Area of Applicability	Requirements	How to apply	Comments
		<p>The nearest available ETOPS alternate within 240-minutes diversion time must be specified in the dispatch or flight release.</p> <p>In conducting such a flight the certificate holder must consider Air Traffic Service's preferred track.</p> <p>The criteria used by the certificate holder to decide that extreme weather precludes using an airport must be established by the certificate holder, accepted by the DGCA, and published in the certificate holder's manual for the use of dispatchers and pilots.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p> <p>This exception may be used in the North Polar Area and in the area north of NOPAC only in extreme conditions particular to these areas such as volcanic activity, extreme cold weather at en route airports, airport weather below dispatch requirements, temporary airport conditions, and other weather related events. This exception may be used in the Pacific Ocean area north of the equator only for reasons, such as political or military concern, volcanic activity, airport weather below dispatch requirements, temporary airport conditions and other weather related events.</p>		
<p>240 minute</p>	<p>Areas south of the equator: Pacific Ocean areas between the US West coast and Australia, New Zealand and Polynesia, South Atlantic Oceanic areas, Indian Oceanic areas between</p>	<p>Airplane-engine combination must be ETOPS type design approved for greater than 180 minutes. The certificate holder must ensure the airplane has systems that are capable of complying with the requirements of section 121.633 (b) for time-limited system planning.</p> <p>Certificate holder must have existing 180-minute ETOPS operating authority for the airplane-engine combination to be operated.</p> <p>The certificate holder must have previous ETOPS experience satisfactory to the Administrator.</p> <p>In addition to the equipment specified in the certificate holder's minimum equipment list for 180-minute ETOPS, the following systems must be operational for dispatch:</p> <p>The fuel quantity indicating system, The APU (including electrical and pneumatic supply and operating to the APU's designed capability) when the APU is necessary for an airplane to The communication system required by section 121.99(d) or section 121.122(c), as applicable, and comply with ETOPS requirements, The auto throttle system, One-engine inoperative auto-land capability, if flight planning is predicated</p>	<p>Request made to the DGCA for route authority. The application will show the need for such an authority.</p>	<p>This is an unlimited authority</p>

Approval Level	Area of Applicability	Requirements	How to apply	Comments
	Australia and South America	<p>on its use.</p> <p>Comply with all part 121 flight operations and maintenance requirements pertaining to ETOPS as provided in Chapter 3 of this AC.</p> <p>The nearest available ETOPS alternate within 240-minutes diversion time must be specified in the dispatch or flight release.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>		
Beyond 240 minute	<p>specific city pairs in the following areas as designated in the operators application:</p> <p>Ocean areas between the U.S. West coast and Australia, New Zealand and Polynesia, South Atlantic Oceanic areas, Indian Ocean areas</p> <p>Oceanic areas between Australia and South America</p> <p>South Polar Area</p>	<p>Airplane-engine combination must be ETOPS type design approved for greater than 180-minute. The certificate holder must ensure the airplane has systems that are capable of complying with the requirements of section 121.633 (b) for time-limited system planning.</p> <p>The certificate holder must have existing 180-minute ETOPS operating authority for the airplane-engine combination to be operated.</p> <p>The certificate holder must have previous ETOPS experience satisfactory to the Administrator.</p> <p>The operator must have been operating at 180-minute or greater ETOPS authority for at least 24-consecutive months, of which at least 12-consecutive months must have been under 240-minute ETOPS authority with the airplane-engine combination to be used.</p> <p>In addition to the equipment specified in the certificate holder's minimum equipment list for 180-minute ETOPS, the following systems must be operational for dispatch:</p> <p>The fuel quantity indicating system,</p> <p>The APU (including electrical and pneumatic supply and operating to the APU's designed capability) when the APU is necessary for an airplane to comply with ETOPS requirements,</p> <p>The auto throttle system,</p> <p>The communication system required by section 121.99(d) or section 121.122(c), as applicable, and</p> <p>(E) One-engine inoperative auto-land capability, if flight planning is predicated on its use.</p> <p>The certificate holder must comply with all part 121 flight operations and maintenance pertaining to ETOPS as provided in Chapter 3 of this AC.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	<p>Request made to the DGCA for route authority. The application will show the need for such an authority.</p>	<p>There is no time limit to this authority.</p>

2) Passenger-Carrying Airplanes with more than Two Engines

Approval Level	Area of Applicability	Requirements	How to apply	Comments
Beyond 180 minute	Unlimited area of the world	<p>The airplane-engine combination must be type-design-approved for ETOPS, except as provided in section 121.162 (see comments).</p> <p>The certificate holder must ensure the airplane has systems that are capable of complying with the requirements of section 121.633 for time-limited system planning.</p> <p>The operator must designate the nearest available ETOPS alternate or alternates within 240-minutes diversion time (at one engine inoperative cruise speed under standard conditions in still air). If an ETOPS alternate is not available within 240 minutes, the operator must designate the nearest available ETOPS alternate or alternates along the planned route of flight.</p> <p>The minimum equipment list (MEL) limitations for the authorized ETOPS diversion time apply.</p> <p>The Fuel Quantity Indicating System must be operational.</p> <p>The communications systems required by section 121.99(d) or section 121.122(c) must be operational, except for three and four-engine airplanes operating 180 minutes or less from an alternate in the North Polar and South Polar areas.</p> <p>The certificate holder must operate in accordance with the ETOPS authority as contained in its OpSpecs and ACL.</p>	<p>Request made to the DGCA for route authority. The application will show the need for such an authority. Certificate holders who have authority to operate on specific routes that under this AC are newly defined as ETOPS routes do not have to re-apply for specific route authority. The certificate holder will be required to comply with all the ETOPS operational requirements in this AC.</p>	<p>section 121.162 allows for an airplane with more than 2 engines manufactured on or after February 17, 2015, the CMP document for that model airplane-engine combination issued in accordance with type certification approval from the State of Design. The certificate holder should review their aircraft for applicability. Those airplanes not required to have an ETOPS type design do not have any CMP or Parts control compliance requirements.</p>

3) All airplanes planned on routings any portion of which enter the North Polar or South Polar areas.

Approval Level	Area of Applicability	Requirements	How to apply	Comments
	<p>North Polar area — the entire area north of 78N latitude and, South Polar area — the entire area south of 60S latitude</p>	<p>In addition to any applicable requirements of Sections 1. and 2. of this Appendix, the certificate holder's operations specifications must contain the following: The designation of alternate airports that may be used for enroute diversions and the requirements the airports must meet at the time of diversion. Except for supplemental, all-cargo operations, a recovery plan for passengers at diversion alternates. A fuel-freeze strategy and procedures for monitoring fuel freezing. A plan to ensure communication capability for these operations. An MEL for these operations. A training plan for operations in these areas. A plan for mitigating crew exposure to radiation during solar flare activity. A plan for providing at least two cold weather anti-exposure suits in the aircraft, to protect crewmembers during outside activity at a diversion airport with extreme climatic conditions. The DGCA may relieve the certificate holder from this requirement if the season of the year makes the equipment unnecessary.</p>	<p>Certificate holders must submit an application with all supporting data to the DGCA. This application must address all the regulatory requirements for Polar operations and the guidance in this AC. The application should be submitted at least 60 days prior to the proposed start of polar operations with the specific airplane-engine combination.</p>	<p>Except for intrastate operations within the State of Alaska. These requirements are in addition to any applicable ETOPS requirements listed in chapters 3 and 4 of this AC. The validation requirements of this approval include an exercise of the certificate holder's passenger recovery plan.</p>

APPENDIX 3. ETOPS APPROVAL METHODS

The two different approval methods available for a certificate holder's use are described in this appendix.

1. In-Service Experience Method (Two-Engine ETOPS for up to 180-Minute ETOPS).

a. General.

- 1) An in-service experience program is one way of gaining ETOPS operational approval. As a prerequisite to obtaining any operational approval, the certificate holder should show that an acceptable level of propulsion system reliability has been achieved in service by the world fleet for that particular airplane-engine combination. The candidate certificate holder also should obtain sufficient maintenance and operation familiarity with the particular airplane-engine combination. Each certificate holder requesting approval to conduct ETOPS by the in-service method should have operational experience appropriate to the operation proposed.
- 2) This appendix contains guidelines for requisite in-service experience. These guidelines may be reduced or increased following review and concurrence on a case-by-case basis by the DGCA. Any reduction or increase in in-service experience guidelines will be based on an evaluation of the certificate holder's ability and competence to achieve the necessary reliability for the particular airplane-engine combination in ETOPS. For example, a reduction in in-service experience may be considered for a certificate holder who can show extensive in-service experience with a related engine on another airplane that has achieved acceptable reliability. In contrast, an increase in in-service experience may be considered for those cases where heavy maintenance has yet to occur and/or abnormally low number of takeoffs has occurred.

b. Specific Approvals.

- 1) **75- and 90-Minute Operation.** Consideration may be given to the approval of 75-minute and 90-minute ETOPS for certificate holders with minimal or no in-service experience with the airplane-engine combination. This determination considers such factors as the proposed area of operations, the certificate holder's demonstrated ability to successfully introduce airplanes into operations, and the quality of the proposed maintenance and operations programs.
- 2) **120-Minute Operation.** Each certificate holder requesting approval to conduct ETOPS with a maximum diversion time (in still air) of 120 minutes should have 12 consecutive months of operational in-service experience with the specified airplane-engine combination. In-service experience guidelines may be increased or decreased by the DGCA.

3) 180-Minute Operation.

- a) Each certificate holder requesting approval to conduct ETOPS with a maximum diversion time (in still air) of 180 minutes should have previously gained 12-consecutive months of operational in-service experience with the specified airplane-engine combination in conducting 120-minute ETOPS. In-service experience guidelines may be reduced or increased by the DGCA. Likewise, the substitution of in-service experience, which is equivalent to the actual conduct of 120-minute ETOPS operations, also will be established by the DGCA, on a case-by-case basis.
- b) Before approval, the certificate holder's capability to conduct operations and implement effective ETOPS programs in accordance with the criteria detailed in this AC will be examined. Only certificate holders who have demonstrated capability to successfully conduct a 120-minute program will be considered for approval beyond 120-minutes. Approval will be given on a case-by-case basis for an increase to their area of operation beyond 120-minutes. The dispatch limitation will be a maximum diversion time of 180 minutes to an ETOPS alternate at an approved one-engine inoperative speed (under standard conditions in still air).

c. Requesting Approval.

A certificate holder requesting approval under CASR part 121, section 121.161 for ETOPS under this method should submit the request with the required supporting data to the DGCA at least 60 days before the proposed start of ETOPS operation with the specific airplane-engine combination. In considering an application from a certificate holder to conduct ETOPS, the DGCA should assess the certificate holder's overall safety record, past performance, flight crewmember training, and maintenance programs. The data provided with the request should substantiate the certificate holder's ability and competence to safely conduct and support these operations and should include the means used to satisfy the considerations outlined in this paragraph.

2. Accelerated ETOPS Method (Up to 180-Minute ETOPS for Two-Engine Airplanes and for all ETOPS for Passenger-Carrying Airplanes With More Than Two Engines).

This section describes the means by which a certificate holder may initiate ETOPS operations when the certificate holder establishes the processes necessary for successful and reliable ETOPS operations and proves to the DGCA that such processes can be successfully applied throughout the applicant's ETOPS operations. This may be achieved by thorough documentation and analysis of processes and process validation, or demonstration on another airplane/validation (as described under process validation in this appendix, below) or a combination of these processes.

- a. **ETOPS Processes.** The airplane-engine combination for which the certificate holder is seeking accelerated ETOPS operational approval must be ETOPS type design-approved (except for two-engine ETOPS at 75-minute authorization and for passenger-carrying airplanes with more than two engines manufactured prior to March 17, 2015) and be capable of operating at a satisfactory level of reliability before commencing ETOPS. The certificate holder seeking accelerated ETOPS operational approval must demonstrate to the DGCA that it has an ETOPS program in place that consists of all the following applicable ETOPS process elements:

- 1) The applicable process elements defined as the ETOPS maintenance and operations requirements of Chapter 3, paragraphs 301 through 304.

NOTE: Passenger carrying airplanes with more than two engines are exempt from the ETOPS maintenance requirements. Therefore the operator may ignore the maintenance processes described in this Appendix.

- 2) Documentation of the following elements as appropriate:
 - a) Technology new to the certificate holder and significant difference in primary and secondary power (engines, electrical, hydraulic, and pneumatic) systems between the airplanes currently operated and the two-engine airplane for which the certificate holder is seeking ETOPS operational approval.
 - b) The plan to train flight and maintenance personnel to the differences identified in the maintenance subparagraph above.
 - c) The plan to use proven manufacturer-validated training and maintenance and operations manual procedures relevant to ETOPS for the two-engine airplane for which the certificate holder is seeking accelerated ETOPS operational approval.
 - d) Changes to any previously proven validated training, maintenance or operations manual procedures used in previous non-ETOPS operations or in previous ETOPS with a different airplane-engine combination and/or geographic area of operations. Depending on the nature and extent of any changes, the certificate holder may be required to provide a plan for validating such changes.
 - e) The validation plan for any additional certificate holder unique training and procedures relevant to ETOPS.
 - f) Details of any ETOPS program support from the airframe manufacturer, engine manufacturer, other certificate holders or any other outside person.
 - g) The control procedures when maintenance or flight dispatch support is provided by an outside person as described above.

b. Process Validation Methodology.

- 1) Paragraph (a) identifies those process elements that should be proven

before ETOPS authority is granted by the DGCA under the accelerated ETOPS approval program. For a process to be considered proven the process should first be defined. Typically, this will include a flow chart showing the various elements of the process. Roles and responsibilities of the personnel who will be managing this process should be defined including any training requirement. The certificate holder should demonstrate that the process is in place and functions as intended. The certificate holder may accomplish this by thorough documentation and analysis, or by demonstrating on an airplane, that the process works and consistently provides the intended results. The certificate holder should define the necessary evaluation duration to validate the process and also show that a feedback loop exists to illustrate need for revision of the process, if required, based on in-service experience.

- 2) Normally the choice to use or not to use demonstration on an airplane as a means of validating individual processes should be determined by the certificate holder. Process validation may be done with the airframe-engine combination that will be used in ETOPS. It can also be done with a different airplane type from that for which ETOPS approval is being sought, including an airplane with more than two engines, if it can be shown that the particular airplane- engine combination in the certificate holder's ETOPS program is not necessary to validate a process. With sufficient preparation and dedication of resources, such validation may not be necessary to assure processes that produce acceptable results. However, if the plan proposed by the certificate holder to prove processes is determined by the DGCA to be inadequate or the plan does not produce acceptable results, validation of the processes with an airplane will be required.
- 3) If a certificate holder currently is conducting ETOPS with a different airplane-engine combination, it may be able to document that it has proven ETOPS processes in place with only minimal further validation required. If the certificate holder has similar non-ETOPS operations and can simulate or demonstrate proven ETOPS processes in such operations, credit can be given for such successful evaluations. In either case, the certificate holder should demonstrate that the means are in place to assure equivalent results with the airplane-engine combination being proposed for ETOPS operational approval. The following elements may aid in justifying a reduction in the validation requirement of ETOPS processes:
 - a) Experience with other airframes and/or engines,
 - b) Previous ETOPS experience,
 - c) Experience with long range, overwater operations with two-, three-, or four-engine airplanes, and
 - d) Experience gained by flight crewmembers and maintenance and flight dispatch personnel while working with other ETOPS-approved certificate holders.

c. Application for Accelerated ETOPS Program.

The certificate holder seeking accelerated ETOPS operational approval should

submit an Accelerated ETOPS operational approval plan to the DGCA six months before the proposed start of ETOPS. This will provide sufficient time for the certificate holder and the DGCA to validate the effectiveness of all ETOPS process elements ("proven process"). The certificate holder's application for ETOPS should:

- 1) State the ETOPS authority requested. Define proposed routes and the ETOPS diversion time necessary to support these routes and the airplane-engine combination to be flown.
- 2) Define processes and related resources being allocated to initiate and sustain ETOPS operations in a manner that demonstrates commitment by management and all personnel involved in ETOPS maintenance and operational support.
- 3) Provide a documented plan for compliance with requirements listed in this section for Accelerated ETOPS.
- 4) Define Review Gates. A review gate is a milestone- tracking plan to allow for the orderly tracking and documentation of specific provisions of this Appendix. Each review gate should be defined in terms of the process elements to be validated. Normally, the review gate process will start six months before the proposed start of ETOPS and should continue until at least six months after the start of ETOPS. The review gate process will help ensure that the proven processes comply with the provisions of this AC and are capable of continued ETOPS operations.

d. **Validation of Process Elements.** When the certificate holders accelerated ETOPS plan receives approval by the DGCA, a validation of the process elements of the accelerated ETOPS plan should begin. Close coordination between the certificate holder and the DGCA is necessary for a successful validation of the ETOPS plan. All process elements required in paragraph (a) should be validated.

- 1) Before the start of the validation of the process elements, the following information should be part of the Accelerated ETOPS plan submitted to the DGCA:
 - a) Validation periods, including start dates and proposed completion dates.
 - b) Definition of airplane(s) to be used in the validation. List should include registration numbers, manufacturer and serial number and model of the airframes and engines.
 - c) Description of the areas of operation (if relevant to validation objectives) proposed for validation and actual ETOPS.
 - d) Definition of designated ETOPS validation routes. The routes should be of duration necessary to ensure process validation occurs.
- 2) Process validation reporting. The certificate holder should compile results of ETOPS process validation. The certificate holder should:
 - a) Document how each element of the ETOPS process was utilized during the validation.
 - b) Document any shortcomings with the process elements and measures in place to correct such shortcomings.

- c) Document any changes to ETOPS processes that were required after an IFSD, unscheduled engine removals, or any other significant operational events.
- 3) When there is concurrence between the certificate holder and the DGCA that a process element has been successfully proven, the review gate should be closed and confirmation documented. Provide periodic process validation reports to the DGCA. This should be addressed during the review gates. The certificate holder should include a final review gate prior to final ETOPS approval that is the validation flights described in Chapter 4, paragraphs 404 and 405 of this AC. This review gate should ensure that all ETOPS processes have been proven Any validation program should address the following:
- a) The certificate holder should show that it has considered the impact of the ETOPS validation program with regard to safety of flight operations. The certificate holder should state in its application any policy guidance to personnel involved in the ETOPS process validation program. Such guidance should clearly state that ETOPS process validation exercises should not be allowed to adversely impact the safety of operations especially during periods of abnormal, emergency, or high cockpit workload operations. It should emphasize that during periods of abnormal or emergency operation or high cockpit workload ETOPS process validation exercises may be terminated.
 - b) The validation scenario(s) should be of sufficient frequency and operational exposure to validate maintenance and operational support systems not validated by other means.
 - c) A means must be established to monitor and report performance with respect to accomplishment of tasks associated with ETOPS process elements. Any recommended changes to ETOPS maintenance and operational process elements should be defined.
- e. **Final Approval for Accelerated ETOPS Authority.** At the successful completion of the certificate holder's accelerated ETOPS validation program all process elements should have been validated and appropriate review gates closed. Report of a successful completion of review gates will be forwarded to the DGCA. Upon final concurrence and approval, the applicant should forward to the DGCA a plan for final validation flights to be conducted over proposed routes in the ETOPS area of operation and in the airframe-engine combination listed in the certificate holder's application. This DGCA witnessed ETOPS validation flight or flights will be conducted in accordance with Chapter 4, paragraphs 404 and 405 of this AC. The purpose of these flights is for the certificate holder to demonstrate to the DGCA that it has the competence and capability to safely conduct and adequately support the intended ETOPS operation.