

The 777-300ER, which is a derivative of the Model 777-300 airplanes, has the following differences from the Model 777-300:

- The wingspan is increased from 199 feet, 11 inches to 212 feet, 7 inches.
- Maximum intended takeoff weight is 750,000 pounds.
- It is capable of carrying from 359 to 550 passengers.
- It has provisions for overhead crew and attendant rest areas.
- Its range capability will be up to 7,250 nautical miles (13,427 kilometers).
- It has 115,300 pound thrust GE90 engines.
- It has a supplemental electronic tail skid.
- It has a semi-levered main landing gear.

Both models are currently approved under Type Certificate No. T00001SE.

For the Model 777-300ER and Model 777-200LR, Boeing has proposed certain changes to the ETOPS special conditions in order to take into account the experience from the original baseline Model 777 engine programs and to eliminate any unnecessary burden from the airplane demonstration testing required by paragraph (e)(7) of those special conditions.

#### Type Certification Basis

Under the provisions of § 21.101, Amendment 21-69, effective September 16, 1991, for a change to a type certificate Boeing must show that the Boeing Model 777 series airplane, as changed, continues to meet the applicable provisions of the regulations incorporated by reference in Type Certificate No. T00001SE or the applicable regulations in effect on the date of application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The regulations incorporated by reference in Type Certificate No. T00001SE for the Boeing Model 777 series airplanes include 14 CFR part 25, as amended by Amendments 25-1 through 25-82. The original type certification basis is listed in Type Certificate Data Sheet No. T00001SE.

If the Administrator finds that the applicable airworthiness regulations (*i.e.*, 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model 777 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

In addition to the applicable airworthiness regulations and special conditions, Boeing Model 777 series

airplanes must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36.

Special conditions, as defined in § 11.19, are issued in accordance with § 11.38 and become part of the type certification basis in accordance with § 21.101(b)(2), Amendment 21-69, effective September 16, 1991.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

#### ETOPS Certification

All two-engine airplanes operating under 14 CFR part 121 are required to comply with § 121.161, which states, in pertinent part, that "Unless authorized by the Administrator \* \* \* no certificate holder may operate two-engine airplanes \* \* \* over a route that contains a point farther than one hour flying time \* \* \* from an adequate airport." Advisory Circular (AC) 120-42A, "Extended Range Operation With Two-Engine Airplanes (ETOPS)," provides an acceptable means for obtaining FAA approval for two-engine airplanes to operate over a route that contains a point farther than one hour flying time from an adequate airport. The two basic objectives of this advisory circular are to establish that the airplane and its supporting systems are suitable for the extended range mission and that the maintenance and procedures to be employed in conducting ETOPS operations are adequate. This is accomplished by acquiring a substantial amount of service experience during non-ETOPS operation and then extensively evaluating this experience in the areas of systems reliability, maintenance tasks, and operating procedures. When it is determined that the appropriate reliabilities and capabilities have been achieved, the airplane is found eligible to be considered for use in ETOPS operation by an airline.

When Boeing was developing the Model 777 series airplane, it proposed that the Model 777 be approved for ETOPS operation simultaneously with the issuance of the basic type certificate. At that time procedures did not exist for a finding of this type. The proposed

issuance of ETOPS type design approval at certification would have precluded using accumulation of service experience, as outlined in AC 120-42A, as a means to meet ETOPS approval requirements. So an alternative method was devised that provided an adequate level of inherent airplane reliability for ETOPS. It is important to note that the requirements for certification of the airplane regarding the design's suitability for ETOPS operation, as described in those special conditions, relate to type certification approval only. Advisory Circular 120-42A contains guidance regarding operational and maintenance practices criteria that must be met by the operator before ETOPS operations can be conducted. It is incumbent upon the operator to apply for operational approval in accordance with appropriate guidance issued by the FAA for such approvals. Satisfaction of the requirements of these special conditions does not constitute operational approval.

Special Conditions 25-ANM-84 contained the additional safety standards that the Administrator considered necessary to establish a level of safety equivalent to that provided by the airworthiness standards for transport category airplanes for non-ETOPS airplanes. Experience with these special conditions since issuance has provided the FAA with additional data to justify a revision to those special conditions as described in this notice.

#### Discussion of the Proposed Special Conditions

Boeing has requested the FAA to revise certain parts of the test requirements of Special Conditions 25-ANM-84 defined in paragraph (e). The FAA has concurred that some changes are justified based on an analysis of previous experience applying those special conditions to the original three engine types approved for installation on the Model 777 airplane. The specific changes to those requirements and the justification for each proposed change are discussed below.

#### Paragraph (e)(6) Engine Demonstration Test

The FAA has concluded from a review of in-service experience of the Model 777 series airplanes that the 3000-cycle engine and propulsion system test required by paragraph (e)(6) of Special Conditions 25-ANM-84 provides an adequate opportunity to discover cyclic-related failure modes associated with the design, provided that an adequate post-test evaluation is conducted to find conditions that could result in an inflight shutdown, power