

authorization is normally based on a showing of reliable operation for a minimum of 250,000 engine hours of service in the world fleet. Eligibility for 180-minute ETOPS authorization is normally based on a showing of reliable operation for at least one year in 120-minute ETOPS. The AC also describes an option for reducing the number of hours of service if adequate compensating factors are identified to give a reasonably equivalent database.

On May 18, 1994, the FAA issued Special Conditions No. 25-ANM-84 for the Boeing Model 777 series airplanes (59 FR 28234). These special conditions define requirements for 180-minute ETOPS approval concurrent with basic type certification of the airplane without the service experience outlined in AC 120-42A that would normally be necessary. These special conditions define additional safety standards that the FAA considered necessary to establish a level of safety equivalent to that provided by the airworthiness standards for non-ETOPS airplanes.

The current 777 ETOPS special conditions consist of five main elements needed to provide adequate compensation for the service experience normally required for 180-minute ETOPS eligibility described in AC 120-42A. No single element is considered sufficient by itself, but the FAA has found that the five elements combined provide an acceptable substitute for actual airline service experience. The five elements are:

1. Design for reliability
2. Lessons learned
3. Test requirements
4. Demonstrated reliability
5. Problem tracking system

A description of each of these five elements is contained in the preamble to Special Conditions No. 25-ANM-84.

On December 13, 1999, Boeing Commercial Airplane Group applied for an amendment to Type Certificate No. T00001SE to include the new Model 777-200LR and 777-300ER airplanes. The Model 777-200LR, which is a derivative version of the existing Model 777-200 series airplanes, has the following differences from the Model 777-200:

- 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 301 to 440 passengers.
- It has provisions for overhead crew and attendant rest areas.
- Its range capability will be up to 8,800 nautical miles (16,298 kilometers).
- It has 110,100 pounds thrust GE90 engines.

- It has a supplemental electronic tail skid.

- It has provisions for up to 3 auxiliary fuel tanks in the forward area of the aft cargo bay.

The Model 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 14 CFR 21.101, Boeing must show that the Boeing Model 777 series airplanes 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 to the type certificate. 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.

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.

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