ANNEX 8

to the Convention on

International Civil Aviation

Airworthiness of Aircraft

In the interest of safety, an aircraft must be designed, constructed and operated in compliance with the appropriate airworthiness requirements of the State of Registry of the aircraft. Consequently, the aircraft is issued with a Certificate of Airworthiness declaring that the aircraft is fit to fly.

To facilitate the import and export of aircraft, as well as the exchange of aircraft for lease, charter or interchange, and to facilitate operations of aircraft in international air navigation, Article 33 of the Convention on International Civil Aviation places the burden on the State of Registry to recognize and render valid an airworthiness certificate issued by another Contracting State, subject to the condition that the airworthiness requirements under which such a certificate is issued or rendered valid are equal to or above the minimum standards which may be established by ICAO from time to time pursuant to the Convention. These minimum standards are contained in Annex 8, the first edition of which was adopted by the Council on 1 March 1949.

Annex 8 includes broad standards which define, for application by the national airworthiness authorities, the minimum basis for the recognition by States of Certificates of Airworthiness for the purpose of flight of aircraft of other States into and over their territories, thereby achieving, among other things, protection of other aircraft, third parties and property. It is recognized that ICAO Standards would not replace national regulations and that national codes of airworthiness containing the full scope and extent of detail considered necessary by individual States would be required as the basis for the certification of individual aircraft. Each State is free to develop its own comprehensive and detailed code of airworthiness or to select, adopt or accept a comprehensive and detailed code established by another Contracting State.

The level of airworthiness required to be maintained by a national code is indicated by the broad standards of Annex 8 supplemented, where necessary, by guidance material provided in ICAO's *Airworthiness Technical Manual* (Doc 9760).

Annex 8 is divided into four parts.

Part I includes definitions; Part II deals with procedures for certification and continuing airworthiness of aircraft; Part III includes technical requirements for the certification of new large aeroplane designs; Part IV deals with helicopters.

One of the supporting clauses in the definitions used in the Annex defines the environment in which an aircraft is expected to perform as "anticipated operating conditions". These are conditions which are known from experience or which can be reasonably envisaged to occur during the operational life of the aircraft, taking into account the operations for which the aircraft is made eligible. They also include conditions relative to the weather, terrain surrounding the aerodromes from which the aircraft is expected to operate, functioning of the aircraft, efficiency of personnel and other factors affecting safety in flight. Anticipated operating conditions do not include those extremes which can

be effectively avoided by operating procedures and those extremes which occur so infrequently that higher levels of airworthiness to meet them would render aircraft operations impracticable.

Under the provisions related to continuing airworthiness of aircraft, the State of Registry must inform the State of Design when it first enters in its register an aircraft of the type certified by the latter. This is to enable the State of Design to transmit to the State of Registry any generally applicable information it has found necessary for the continuing airworthiness and for the safe operation of the aircraft. The State of Registry must also transmit to the State of Design all continuing airworthiness information originated by it for transmission, as necessary, to other Contracting States known to have on their registers the same type of aircraft.

To assist States in establishing contact with appropriate national airworthiness authorities, necessary information has been provided in an ICAO circular (Circ 95) which is available on the ICAO-Net.

The technical standards dealing with certification of aeroplanes are limited at present to multi-engined aeroplanes of over 5 700 kg maximum certificated takeoff mass. These standards include requirements related to performance, flying qualities, structural design and construction, engine and propeller design and installation, systems and equipment design and installation, and operating limitations including procedures and general information to be provided in the aeroplane flight manual, crashworthiness of aircraft and cabin safety, operating environment and human factors and security in aircraft design.

The performance standards require that the aeroplane shall be capable of accomplishing the minimum performance specified in the Annex at all phases of flight, in the event that the critical power-unit has failed and the remaining power-units are operated within their take-off power limitations, be capable of safely continuing or abandoning its take-off. After the initial take-off phase, the aeroplane must be capable of continuing climb up to a height at which the aeroplane can continue safe flight and landing, while the remaining power-units are operating within their continuous power limitations.

The aeroplane must be controllable and stable under all anticipated operating conditions without exceptional skill, alertness or strength on the part of the pilot, even in the event of failure of any power-unit. Furthermore, the stall characteristics of the aeroplane must be such as to give the pilot clear warning, and it should be possible for the pilot to maintain full control of the aeroplane without altering engine power.

Requirements for detailed design and construction provide for a reasonable assurance that all aeroplane parts will function reliably and effectively. Functioning of all moving parts essential to safe operation must be demonstrated by suitable tests, and all materials used must conform to approved specifications. Methods of fabrication and assembly must produce a consistently sound structure which must be protected against deterioration or loss of strength due to weathering, corrosion, abrasion or other causes, which could pass unnoticed. Means must be provided which will automatically prevent emergencies or enable the crew to deal with them effectively, and design should minimize the possibility of in-flight fires, cabin depressurization and toxic gases in the aeroplane and the aircraft against lightning and static electricity.

Special consideration is given to requirements dealing with design features which affect the ability of the flight crew to maintain controlled flight. The layout of the flight crew compartment must be such as to minimize the possibility of incorrect operation of controls due to confusion, fatigue or interference. It should allow a sufficiently clear, extensive and undistorted field of vision for the safe operation of the aeroplane.

Aeroplane design features also provide for the safety, health and well being of occupants by providing an adequate cabin environment during the anticipated flight and ground and water operating conditions, the means for rapid and safe evacuation in emergency landings and the equipment necessary for the survival of the occupants following an emergency landing in the expected external environment for a reasonable time-span.

Requirements for the certification of engines and accessories are designed to ensure that they function reliably under the anticipated operating conditions. An engine of the type must be tested to establish its power or thrust from characteristics, to ensure that operating parameters are satisfactory and to demonstrate adequate margins of freedom from detonation, surge or other detrimental conditions.

Tests must be of sufficient duration and must be conducted at such power and other operating conditions as are necessary to demonstrate the reliability and durability of the engine.

Following the recent events of highjacking and terrorist acts on board aircraft, special security features have been included in aircraft design to improve the protection of the aircraft. These include special features in aircraft systems, identification of a least-risk bomb location, and strengthening of the cockpit door, ceilings and floors of the cabin crew compartment.