

application for the change. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The certification basis for the Model 1124 airplanes includes 14 CFR 21.29; CAR 4b effective December 31, 1953, including amendments 4b-1 through 4b-11, and 4b-12; paragraphs 4b.132(e), 4b.151(a), 4b.155, 4b.156, 4b.157, 4b.158, 4b.160, 4b.162, 4b.191, 4b.210(b)(5), 4b.603(k); 4b.711; and paragraphs pertaining to engine fire shielding. In addition, the certification basis includes Special Regulations (SR) SR 422b, effective July 9, 1959; SR 450A, effective August 31, 1962; § 25.771 as amended by Amendment 25-4; § 25.2 as amended by Amendments 25-15, 25-17, and 25-20; § 33.97, as amended by Amendment 33-3, and § 33.99; Special Conditions specified in FAA letters of December 13, 1963, and June 2, 1964; Special Conditions 25-37-EU-8, dated November 16, 1971; and Special FAR 27 effective January 1, 1974; and the following 14 CFR part 25 sections, as amended by Amendments 25-1 through 25-34, which replaced the corresponding CAR 4b paragraphs: §§ 25.831 through 25.843, 25.901 through 25.1203, 25.1305, 25.1521, and 25.1309 with respect to reverse thrust installation.

If the Administrator finds that the applicable airworthiness regulations (*i.e.*, CAR 4b or part 25, as amended) do not contain adequate or appropriate safety standards for the Israel Aircraft Industries Model 1124 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, the Israel Aircraft Industries Model 1124 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 14 CFR 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 Avionics Certification Services apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. A2SW to incorporate the same or similar novel or unusual design feature, these special conditions would also apply to the other model.

#### Novel or Unusual Design Features

As noted earlier, the Israel Aircraft Industries Model 1124 airplanes modified by Avionics Certification Services will incorporate a dual Air Data Unit Display system that will perform critical functions. This system may be vulnerable to high-intensity radiated fields external to the airplane. The current airworthiness standards of part 25 do not contain adequate or appropriate safety standards for the protection of this equipment from the adverse effects of HIRF. Accordingly, this system is considered to be a novel or unusual design feature.

#### Discussion

There is no specific regulation that addresses protection requirements for electrical and electronic systems from HIRF. Increased power levels from ground-based radio transmitters and the growing use of sensitive avionics/electronics and electrical systems to command and control airplanes have made it necessary to provide adequate protection.

To ensure that a level of safety is achieved equivalent to that intended by the regulations incorporated by reference, special conditions are needed

for the Israel Aircraft Industries Model 1124 airplanes modified by Avionics Certification Services. These special conditions require that new avionics/electronics and electrical systems that perform critical functions be designed and installed to preclude component damage and interruption of function due to both the direct and indirect effects of HIRF.

#### High-Intensity Radiated Fields (HIRF)

With the trend toward increased power levels from ground-based transmitters, and the advent of space and satellite communications coupled with electronic command and control of the airplane, the immunity of critical avionics/electronics and electrical systems to HIRF must be established.

It is not possible to precisely define the HIRF to which the airplane will be exposed in service. There is also uncertainty concerning the effectiveness of airframe shielding for HIRF. Furthermore, coupling of electromagnetic energy to cockpit-installed equipment through the cockpit window apertures is undefined. Based on surveys and analysis of existing HIRF emitters, an adequate level of protection exists when compliance with the HIRF protection special condition is shown with either paragraph 1 OR 2 below:

1. A minimum threat of 100 volts rms (root-mean-square) per meter electric field strength from 10 KHz to 18 GHz.

a. The threat must be applied to the system elements and their associated wiring harnesses without the benefit of airframe shielding.

b. Demonstration of this level of protection is established through system tests and analysis.

2. A threat external to the airframe of the field strengths identified in the table below for the frequency ranges indicated. Both peak and average field strength components from the table are to be demonstrated.

| Frequency             | Field strength (volts per meter) |         |
|-----------------------|----------------------------------|---------|
|                       | Peak                             | Average |
| 10 kHz–100 kHz .....  | 50                               | 50      |
| 100 kHz–500 kHz ..... | 50                               | 50      |
| 500 kHz–2 MHz .....   | 50                               | 50      |
| 2 MHz–30 MHz .....    | 100                              | 100     |
| 30 MHz–70 MHz .....   | 50                               | 50      |
| 70 MHz–100 MHz .....  | 50                               | 50      |
| 100 MHz–200 MHz ..... | 100                              | 100     |
| 200 MHz–400 MHz ..... | 100                              | 100     |
| 400 MHz–700 MHz ..... | 700                              | 50      |
| 700 MHz–1 GHz .....   | 700                              | 100     |
| 1 GHz–2 GHz .....     | 2000                             | 200     |
| 2 GHz–4 GHz .....     | 3000                             | 200     |
| 4 GHz–6 GHz .....     | 3000                             | 200     |
| 6 GHz–8 GHz .....     | 1000                             | 200     |