

**DEPARTMENT OF CIVIL AVIATION
MALAYSIA
AIRWORTHINESS NOTICE**

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Date: 1 September 1994

SOFTWARE MANAGEMENT

1. Introduction

- 1.1 This Notice sets out additional requirements applicable to certification and continued airworthiness control of software used in aircraft equipment, systems and their associated automatic test equipment (ATE).
- 1.2 Extensive use is now being made in aircraft of software based equipment and systems. Typically, software may be used in primary and secondary flight controls, engine controls, electrical generation and distribution, brakes, radio and navigation equipment, flight instruments, and automatic flight control. The software may have a direct influence on aircraft safety. Hence, in meeting the appropriate aircraft requirements and for controlled Items, the Requirements of BCAR Section A, it is necessary to investigate the software design and to control its certification and post-certification configuration in a manner equivalent to that for conventional safety-critical systems.
- 1.3 RTCA document DO-178A entitled "Software Considerations in Airborne System and Equipment Certification", provides guidance to aircraft constructors, equipment manufacturers and aircraft operators on software practices that would support the certification of software-based equipment and systems. This document is acceptable as a basis for the certification of the software in aircraft equipment and systems.

2. Requirements

2.1 General

- 2.1.1 In addition to the normal assessment of system criticality, the responsible Design Organisation (normally the aircraft constructor) shall assign a Software Criticality Category to each software-based equipment or system which shall relate to the severity of the effect of possible software errors within the equipment or system. See Appendix to this notice.

NOTE: Criticality Categories are defined in FAR 25.1309 and JAR 25.1309.

- 2.1.2 Where the equipment is the subject of an application for Accessory Approval, the level of Software Criticality Category shall be declared in the Declaration of Design and Performance as defined by BCAR Section A, Chapter A4-8, or an equivalent procedure acceptable to DCA.
- 2.1.3 Where the equipment or system is to be approved under Component Procedure or Aircraft Modification Procedure the Software Criticality Category of the equipment or system shall be declared. This shall be as defined by BCAR Section A, Chapter A4-8, A2-5, A5-6, A6-6, A6-7, or an equivalent procedure acceptable to DCA.
- 2.1.4 Details of equipment and system Software Criticality Categories should be provided to the aircraft operator and DCA to assist in the evaluation of post-certification modifications (See paragraph 2.3 of this Notice).

2.2 Initial Certification

In respect of a software-based equipment or system, the responsible design organisation shall provide evidence to the DCA that the software has been designed, tested and integrated with the hardware in a manner which ensures compliance with BCAR Section A (see paragraph 3.1 of this Notice).

- 2.2.1 In respect of ATE software, the initial Software Control shall be certified by a responsible Design Organisation (normally the manufacturer) who shall ensure that the software and its control is in compliance with BCAR Section A, Chapter A7-4 Appendix No. 1.

2.3 Post-Certification Modifications

In respect of equipment and systems with software in the Major, Hazardous or Catastrophic Criticality Categories, a modification which affects software shall not be embodied unless it has been approved by the responsible Design Organisation (see paragraph 3.2 of this Notice).

- 2.3.1 Operators and Maintenance Organisations may amend ATE software, provided that any amendment is in accordance with BCAR Section A and that the amendment is within the terms of their DCA Approval.

3. Interpretation of Requirements

3.1 Initial Certification

3.1.1 An applicant for the approval of a software-based equipment or system may use the guidance material given in document DO-178A (or an agreed equivalent Standard) as a means of securing DCA approval of the associated software.

3.1.2 A software configuration Management Plan e.g. as defined in Part 7 of document DO-178A will be required as a means of software identification and change control to be effective throughout the life of the equipment. The plan will need to be managed by the responsible design organisation.

3.2 Post-Certification Modifications

3.2.1 Modifications to software will be subject to the same approval procedures as are applied to hardware modifications (see BCAR Section A, Chapter A2-5, A5-6, A6-6 or A6-7 as appropriate). Modified software will need to be identified and controlled in accordance with the procedures stated in the Software Configuration Management Plan. The guidance material given in document DO-178A (or an agreed equivalent standard) may be used as a basis for the approval of software modifications.

NOTE: The term 'maintenance' is often used by software specialists when referring to modification to software.

3.2.2 The DCA will require the design and investigation of a modification, including those proposed by the aircraft operator, to involve the support service provided by the design organisation responsible for the equipment or system. It is unlikely that an aircraft operator could justify the establishment of its own software design capability. Therefore, where the Software Criticality Category is Major, Hazardous or Catastrophic, the aircraft constructor would normally be the appropriate Design Organisation, although tasks may be delegated to the equipment manufacturers or software organisations.

3.2.3 Aircraft operators will need to ensure that their normal procedures will report software problems to the responsible design organisation.

4. Cancellation

This Notice cancels Airworthiness Notice No. 57, Issue 1, dated 1 April, 1987, which should be destroyed.

DIRECTOR GENERAL
DEPARTMENT OF CIVIL AVIATION
MALAYSIA