

A stylized paper airplane icon in shades of blue and grey is shown flying over a dashed grey line that represents a flight path. The path starts on the left, curves upwards, then downwards, and then upwards again towards the right. The background features large, light grey abstract shapes that resemble the map of Malaysia.

CIVIL AVIATION DIRECTIVE – 8109

# INSTALLATION OF MODIFICATIONS

CAAM PART 21 SUBPART D – 1

CIVIL AVIATION AUTHORITY OF MALAYSIA

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## Introduction

In exercise of the powers conferred by section 24O of the Civil Aviation Act 1969 [Act 3], the Chief Executive Officer makes this Civil Aviation Directive (CAD) 8109 – Installation of Modifications (CAAM Part 21 Subpart D-1), pursuant to Regulation 21, 24, 31 and 193 of the Malaysia Civil Aviation Regulation (MCAIR) 2016.

This CAD provides the requirement for embodiment of modifications on Malaysian aircraft and for any matters connected therewith.

This CAD 8109 – Installation of Modifications (CAAM Part 21 Subpart D-1) is published by the Chief Executive Officer under section 24O of the Civil Aviation Act 1969 [Act 3] and come into operation on 1<sup>st</sup> May 2021.

### Non-compliance with this CAD

Any person who contravenes any provision in this CAD commits an offence and shall on conviction be liable to the punishment under section 24O of the Civil Aviation Act 1969 [Act 3].

**(Captain Chester Voo Chee Soon)**  
Chief Executive Officer  
Civil Aviation Authority of Malaysia

## Civil Aviation Directive components and Editorial practices

This Civil Aviation Directive is made up of the following components and are defined as follows:

**Standards:** Usually preceded by words such as “*shall*” or “*must*”, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

**Recommended Practices:** Usually preceded by the words such as “*should*” or “*may*”, are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

**Definitions:** Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

**Tables and Figures:** These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

**Notes:** Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

**Attachments:** Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

It is to be noted that some Standards in this Civil Aviation Directive incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Directive, the use of the male gender should be understood to include male and female persons.





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## 1 General

### 1.1 Citation

1.1.1 These Directives are the Civil Aviation Directives 8109 – Installation of Modifications (CAAM Part 21 Subpart D-1) [CAD 8109], Issue 01/Revision 00, and comes into operation on 1<sup>st</sup> May 2021.

1.1.2 This CAD 8109 – Installation of Modifications (CAAM Part 21 Subpart D-1), Issue 01/Revision 00 will remain current until withdrawn or superseded.

### 1.2 Applicability

1.2.1 This CAD shall be applicable to—

- a) a holder of an approval for the design of modifications under regulation 24 of the MCAR;
- b) an organisation that is approved to manufacture aeronautical product under regulation 21 of the MCAR;
- c) an organisation that is approved to engage in continuing airworthiness management issued under regulation 31 of the MCAR; and
- d) an organisation that is approved to engage in maintenance of aeronautical product issued under regulation 31 of the MCAR.

### 1.3 Revocation

1.3.1 This CAD, in conjunction with CAD 8104 – Design of Modifications read together with CAD 8105 – Supplemental Type Certificate revokes Airworthiness Notice 78 issue 2 dated 15 May 2005.

### 1.4 Definition

1.4.1 In this CAD, unless the context otherwise requires:

**Aeronautical product** means any aircraft, aircraft engine, aircraft propeller or a part to be installed thereon;

**AMO** means approved maintenance organisation;

**CAMO** means the organisation that is approved to engage in continuing airworthiness management of an aircraft;

**DAH** means design approval holder;

**DAO** means design approval organisation;

**DOA** means design organisation approval;

**EASA** means European Union Aviation Safety Agency;

**FAA** means Federal Aviation Administration;

**MCAR** means Civil Aviation Regulations 2016;

**modifications** means a change to the type design of an aeronautical product which is not a repair

**product approval holder** means the holder of the design approval for an aeronautical product;

**prototype modification** means a modification conforming to design data which has not been approved;

**repair** means the restoration of an aeronautical product to an airworthy condition as defined by the appropriate airworthiness requirements;

**State of Design** means the state having jurisdiction over the organisation responsible for the type design;

**STC** means Supplemental Type Certificate;

**TCCA** means Transport Canada Civil Aviation;

**TSO** means Technical Standard Order issued by the State of Design; and

**type certificate** means a Type Certificate issued by the director General under regulation 23.

## **2 Modification Compliance**

- 2.1 All modifications must comply with airworthiness requirements acceptable to the State of Registry and must be approved with respect to the State of Registry's requirement.
- 2.2 The CAMO of an aircraft have the overall responsibility to ensure that modifications incorporated in their aircraft are approved by the State of Registry accordingly.
- 2.3 All design of modifications to be embodied on Malaysian aircraft shall be:
- a) approved under requirements of CAD 8104 and CAD 8105;
  - b) validated under requirements of CAD 8108; or
  - c) complies to the requirements of paragraph 5 of this CAD.



### **3 Production or Fabrication of Modification Parts**

- 3.1 Parts and appliances to be used for a modification shall be produced or fabricated in accordance with approved data based upon all the necessary design data as provided by the modification design approval holder by:
- a) an organisation appropriately approved in accordance with CAD 8201;
  - b) an appropriately approved maintenance organisation within its scope of approval; or
  - c) the production organisation under the arrangement with type certificate or supplemental type certificate holder.
- 3.2 Any deviations to the approved data provided by the design approval holder required during production or fabrication shall be deemed as a revision to a modification design and shall be approved accordingly.

### **4 Modifications Embodiment**

- 4.1 The embodiment of a modification shall be made in accordance with CAD 8601 or CAD 8602 as appropriate, or by a production organisation appropriately approved in accordance with the privilege under CAD 8201.
- 4.2 The design approval holder shall transmit to the organisation managing and performing the modification all the necessary installation instructions.
- 4.3 Any deviations to the installation instructions provided by the design approval holder required during the embodiment of modification shall be deemed as a revision to a modification design and shall be approved accordingly.

### **5 Aeronautical Product Manufacturer's Modification Design Data**

- 5.1 Modification design data originating from an aeronautical product manufacturer are considered approved by CAAM subject to following conditions:
- a) the modification design approval holder is the Type Certificate, STC, TSO authorisation or product approval holder of the product; and
  - b) the modification design is explicitly identified as approved by the State of Design or design organisation approved by the State of Design (e.g. EASA Part-21 Subpart J DOA, FAA DAH or TCCA DAO); and
  - c) the modification design is transmitted via service bulletins (SB) or equivalent documents.

## **6 Compatibility of Modifications**

- 6.1 The CAMO of an aircraft holds responsibility to verify compatibility with other modifications and repairs before installing any new modification.
- 6.2 The installer of the modification specified in paragraph 4.1 of this CAD shall survey the aircraft records and the aircraft itself to determine what other modification or repair exist on the aircraft. Any questions of incompatibility with other modifications or repairs arising from the survey shall be referred for resolution to the CAMO of the aircraft.
- 6.3 The CAMO contracting with an installer specified in paragraph 4.1 of this CAD for incorporation of any aircraft modification or repair shall provide the installer with information on all existing modification or repair to the aircraft so that compatibility may be verified. Any questions of modification incompatibility which may arise during installation or in service shall be thoroughly investigated by consultation with the modification design approval authority or modification design approval holder.
- 6.4 In every case of incompatibility between modifications or repairs, the problem shall be corrected and it must be established to the satisfaction of the CAAM of that the modified aircraft continues to comply with the applicable standards of airworthiness.
- 6.5 The CAMO shall promptly report any modification incompatibilities detected during installation or in service to the modification design approval holder, to the installer and to CAAM.

## 7 Records

7.1 The CAMO of an aircraft shall ensure that:

- a) procedure is established to ensure that the modification substantiating data supporting compliance with the airworthiness requirements are retained;
- b) in addition to the records of design approval and return-to-service approval, the following kind of data that shall be included, as applicable:
  - 1) a master drawing list and the individual drawings, photographs, specifications and records which identify the design change and location on the aircraft;
  - 2) mass and moment change records; and
  - 3) a record of any change in electrical load caused by incorporation of the design change;
- c) part of the records includes a STC or equivalent document, or service bulletins, if applicable;
- d) the details of modifications to an aircraft and its major components retained for a minimum period of 12 months after the unit to which the records refer has been permanently withdrawn from service;
- e) in the event of a temporary change of operator, the records shall be made available to the new operator; and
- f) In the event of any permanent change of operator, the records shall be transferred to the new operator.

7.2 When applicable, the CAMO shall incorporate into the existing operating data supplements to the approved aircraft flight manual, maintenance instructions, instructions for continuing airworthiness and repair instructions pertaining to a modification. The CAMO shall record the incorporation of the required supplements in the appropriate revision logs.

7.3 All changes to limited life components limits, if applicable, shall be incorporated in the maintenance programme following the modification design approval.

7.4 In the case where the CAMO is also the design approval holder, the operator shall retain the modification design record and the modification embodiment record independently.

## **8 Embodiment of Prototype Modification**

- 8.1 An embodiment of prototype modification on an in-service aircraft may be required before the modification is approved (e.g. for development or to demonstrate compliance with the certification basis). The prototype modification may be embodied on an in-service aircraft with the involvement of the modification design approval holder, the AMO and the CAMO of an aircraft.
- 8.2 CAAM and the modification design approval holder shall be given unrestricted access for inspection, testing and witnessing of the prototype modification.
- 8.3 The Certificate of Airworthiness of an aircraft is considered invalid as soon as the installation of the prototype modification has started. The Certificate of Airworthiness will be rendered valid again once appropriate maintenance release has been issued by the AMO when the prototype modification has been approved or removed from the aircraft.
- 8.4 An approved data in paragraph 2.3 of this CAD is required to remove the installed prototype modification.
- 8.5 The CAMO shall ensure that the AMO has appropriate capability for embodiment of prototype modification in accordance with paragraph 8 of this CAD.
- 8.6 The design approval holder shall establish:
- a) a written arrangement acceptable to CAAM outlining specific responsibilities between the design approval holder, the AMO and the CAMO of an aircraft; and
  - b) specific procedures related to the embodiment of prototype modification as follows:
    - 1) the responsibilities of each party in the implementation of embodiment of prototype modification;
    - 2) airworthiness data exchange between modification design approval holder, the CAMO and the AMO;
    - 3) the assistance provided to the modification design approval holder in development and certification activities;
    - 4) process for AMO to ensure conformity of the prototype modification to the installation data provided by the modification design approval holder;
    - 5) process to manage any deviations identified during installation of the prototype modification;
    - 6) process for AMO to issue maintenance release once the prototype modification has been removed or approved, as applicable.
    - 7) the project timeline which also includes CAAM's level of involvement, where necessary.



- 8.7 The AMO shall ensure that any damages to the aircraft occurred during installation or after removal of the prototype modification are rectified accordingly.
  
- 8.8 A permit to fly with associated flight condition(s) shall be obtained prior to conducting any flight test during the embodiment of a prototype modification. The modification design approval holder is responsible for the flight conditions associated to the design of the modification.

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