



Civil Aviation Advisory Publication

November 2012

CAAPs provide guidance, interpretation and explanation on complying with the Civil Aviation Regulations (CAR) or Civil Aviation Orders (CAO).

This CAAP provides advisory information to the aviation industry in support of a particular CAR or CAO. Ordinarily, the CAAP will provide additional 'how to' information not found in the source CAR, or elsewhere.

A CAAP is not intended to clarify the intent of a CAR, which must be clear from a reading of the regulation itself, nor may the CAAP contain mandatory requirements not contained in legislation.

***Note:** Read this advisory publication in conjunction with the appropriate regulations/orders.*

The relevant regulations and other references

- AC 21.29(0) Commercial Assistance During Construction of Amateur-Built Experimental Aircraft and Amateur-Built (ABAA) Aircraft
- AC 21-35 (0) Calibration - Inspection and Test equipment
- AC 21-46 (1) Airworthiness Approval of Avionics Equipment
- AIP - GEN
- CAO 20.18
- CAO 100.5
- CAO 108.56
- Paragraphs 179A (1) and (2) of CAR 1988
- Paragraph 207 (2) of CAR 1988
- Subpart 21.M of CASR 1998

This CAAP will be of interest to

This Civil Aviation Advisory Publication (CAAP) applies to: Owners, builders and maintainers of amateur built aircraft registered under Part 47 of CASR 1998.

Why this publication was written

This CAAP provides information and guidance about the maintenance requirements for Amateur Built Experimental (ABE), and Amateur Built Aircraft Acceptance (ABAA) aircraft.

This CAAP also includes the maintenance procedures training requirements for owner-builders that were previously published as an annex to the Civil Aviation Safety Authority (CASA) instrument 146/11.

Status of this CAAP

This is the first CAAP to be issued on this subject.

For further information

For application and policy advice contact CASA's Self-Administering Sport Aviation Organisations Office (Telephone 131 757).

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1. Acronyms

ABAA	Amateur Built Aircraft Acceptance
ABE	Amateur Built Experimental
AC	Advisory Circular
AD	Airworthiness Directive
AIP	Aeronautical Information Publication
CAAP	Civil Aviation Advisory Publication
CAO	Civil Aviation Order
CAR	Civil Aviation Regulations 1988
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998

IFR Instrument Flight Rules

LAME Licensed Aircraft Maintenance Engineer

2. Definitions

2.1 For the purpose of this publication, the following definitions apply:

Administering organisation means an organisation approved by CASA to administer certain civil aviation activities.

Amateur Built Aircraft Acceptance (ABAA) means an aircraft for which a special certificate of airworthiness has been issued under Regulation 21.190 of the *Civil Aviation Safety Regulations 1998* (CASR 1998).

Amateur Built Experimental aircraft (ABE) means an aircraft for which an experimental certificate has been issued for a *purpose* mentioned in paragraph 21.191 (g), (h) or (j) of CASR 1998.

Appropriately rated LAME means a licensed aircraft maintenance engineer (LAME) whose licence is endorsed with an appropriate sub category for the aircraft without exclusions that would disallow the maintenance. For example, a LAME with an E10 exclusion could not maintain a wood aircraft structure.

Approved Maintenance Organisation for the purpose of this CAAP means an organisation that holds a *Civil Aviation Regulation 1988* (CAR) 30 or CASR Part 145 approval to carry out the type of maintenance on the aircraft.

Appointed Person in this CAAP means an authorised person who has been appointed by an administering organisation to act on its behalf and in accordance with its CASA approved manual of procedures for the issuing of experimental certificates.

Authorised Person means a person who has been authorised by CASA under Regulation 11.055 of CASR 1998, and wherever mentioned in this CAAP means a person authorised for the purpose of CASR 21.195A to issue experimental certificates for amateur-built aircraft.

Eligible owner-builder means the current owner of an aircraft which he or she has constructed who has:

- met the maintenance procedures training requirements set out in Appendix A of this CAAP; and
- satisfied the major portion requirement.

Licensed Aircraft Maintenance Engineer means a person who holds an aircraft maintenance licence issued by CASA under Part 66 of CASR 1998 and whose licence permits the maintenance and/or certification for maintenance on the aircraft.

Maintenance procedures training requirements means a course of training described in Appendix A of this CAAP which results in the issue of a certificate of completion of the course by a person authorised in Appendix C of this CAAP.

Major portion requirement means the requirement set out in paragraph 21.191(g) of CASR 1998 that more than half of an amateur-built aircraft must be constructed by an amateur builder in order to qualify for an ABE certificate. The requirement also applies to an owner-builder with respect to the granting of certain maintenance privileges.

Owner-builder means a person who has constructed an aircraft for his or her own use.

Primary builder means (a) that member of a group of builders who has fabricated and assembled more than half of an amateur-built aircraft or, (b) if no one member has fabricated more than half of the aircraft, that member of a group who has been nominated in writing by the group as the primary builder.

Registered Operator (RO) means the person mentioned in Regulation 47.100 of CASR 1998.

3. Background

3.1 Subsection 20AB(2) of the *Civil Aviation Act 1988* prescribes a penalty of 2 years imprisonment for any person performing maintenance on an Australian aircraft or aeronautical product if they are not permitted by Regulations to do so.

3.2 Unless otherwise permitted; supervision and certification of maintenance of aircraft may only be carried out by a LAME holding a Part 66 licence with the appropriate category and subcategory, or a person holding either a CAR 33B Airworthiness Authority, or a CAR 33D Welding Authority.

3.3 Regulation 42ZC (4)(e) of CAR 1988 makes provision for CASA to authorise a person other than a LAME or airworthiness/welding authority holder to do maintenance and it is under this provision that CASA authorises individuals to maintain amateur-built aircraft. The authorisation is provided by means of an Instrument which is published by CASA (currently Instrument number CASA 146/11).

4. Aircraft covered by this CAAP

- An ABAA aircraft that is mentioned in Regulation 21.190 of CASR 1998
- An ABE aircraft that is mentioned in paragraph 21.191 (g) of CASR 1998
- A kit-built aircraft that is mentioned in paragraph 21.191(h) of CASR 1998
- An Experimental Light Sport Aircraft that is mentioned in paragraph 21.191 (j) of CASR 1998

5. Maintenance and related activities covered by this CAAP

- Scheduled inspections
- Rectifications and modification
- Maintenance certifications
- Issue of maintenance release

6. Who may perform maintenance on amateur built aircraft?

- An appropriately rated LAME.
- A member of a group of owner-builders who has satisfied the maintenance procedures training requirements (may only maintain those parts of the aircraft that he or she has fabricated).
- An eligible owner-builder.
- The current owner of an amateur-built aircraft who:
 - is able to satisfactorily demonstrate that he or she has previously fabricated and assembled the major portion of an aircraft of a similar type; and

- has satisfied the maintenance procedures training requirements.

Notes:

1. *Some examples of a similar type or model of an aircraft would be (a) Vans RV4 and RV8, (b) Jodel D11 and Piel Emeraude or (c) Rutan Varietze and Q200.*
2. *A person who has previously been authorised as the owner-builder of a fixed undercarriage aircraft may not subsequently maintain a retractable undercarriage aircraft unless the person has fabricated or assembled the major portion of that aircraft.*
3. *In order to qualify for a maintenance authorisation and in addition to completing an approved course of training, an amateur builder must provide CASA or an appointed person with certain things. These include sufficient documentary, photographic and physical evidence that the person or group has constructed the major portion of the aircraft. The evidence must be provided as the construction progresses to allow CASA or the appointed person to be reasonably certain that the major portion requirement prescribed in paragraph 21.191(g) of CASR 1998 is being complied with, and that the builder has acquired sufficient skills and knowledge to be able to safely maintain the aircraft upon its completion.*

7. What is the major portion requirement?

- 7.1 In short, the major portion requirement refers to the amount of work performed by an amateur builder in constructing an aircraft.
- 7.2 In order to qualify for an experimental certificate under paragraph 21.191 (g) of CASR 1998 a person must fabricate and assemble more than half of the aircraft.
- 7.3 If a kit-built aircraft is to be certificated under paragraph 21.191 (h) or (j) of CASR 1998, the major portion requirement does not apply for certification purposes.
- 7.4 The fabrication/assembly work may be carried out by a single individual, a group of individuals or a series of builders, whether individuals or groups.

Eligibility for amateur builder maintenance authorisation

- 7.5 An amateur builder must fabricate and/or assemble the major portion of the aircraft in order to qualify for a maintenance authorisation regardless of whether the aircraft is certified under paragraphs 21.191(g), (h) or (j) of CASR 1998.
- 7.6 The aim of this requirement is to establish that a builder has constructed the aircraft to a sufficient extent that he or she can be reasonably expected to:
- understand the construction of the aircraft and any special processes involved such as scarfing and gluing of wood joints, vacuum bagging of composite components, riveting or bonding of metal construction and application of fabric covering etc.;
 - have assembled and installed the various systems to a sufficient extent that he or she has a sound understanding of the systems, how they work and how to ensure that they will continue to meet required performance standards; and
 - have acquired sufficient relevant hand skills to be able to safely maintain the aircraft to at least the same standard to which it was constructed.

7.7 A person who solely constructed a plans-built aircraft will easily satisfy the major portion requirement.

7.8 If an aircraft is built by a group of individuals such as a syndicate, a co-operative, or a class training project, the individual members of the group are authorised to maintain those parts of the aircraft that they have constructed provided that they have met the maintenance procedures training requirements.

7.9 A person who maintains a portion of an aircraft under the provisions mentioned in paragraph 7.8 must certify for the completion of that maintenance work in the aircraft maintenance records.

7.10 When an aircraft is constructed by a group, and no single individual has personally completed more than half of the project, then a primary builder must be nominated from that group to coordinate the maintenance, issue the maintenance release and manage the maintenance records. This would normally be the person who co-ordinated the project or performed the most significant portion of the building work.

Aircraft component kits require case by case assessment

7.11 As a general rule of thumb, an aircraft kit that comes with a pre-welded fuselage frame or with spars and ribs prefabricated but not pre-assembled as wings, would still meet the major portion requirement and a builder would be eligible to qualify as a maintainer.

7.12 An aircraft that comes with major components prefabricated and ready for bolt-together assembly will NOT meet the major portion requirements. That does not mean that such an aircraft is not entitled to a certificate for the purpose of paragraph 21.191 (h) or (j) of CASR 1998, but it does mean that the builder will not qualify to be the maintainer.

7.13 Aircraft kits that fall between these two parameters should be discussed with CASA or the Sport Aircraft Association of Australia before purchase as they could fall outside the major portion requirements.

7.14 Advisory Circular (AC) 21.29(0) Commercial Assistance During Construction of Amateur-Built Experimental Aircraft and Amateur-Built (ABAA) Aircraft, discusses commercial assistance during construction of amateur-built aircraft and provides a convenient checklist for assessing whether an aircraft meets the major portion requirement.

8. Who may issue a maintenance release for amateur built aircraft?

- An appropriately rated LAME;
- An eligible owner-builder;
- A person who meets the training requirements set out by CASA in a legislative instrument and:
 - who owns the aircraft and has previously constructed the major portion of a similar aircraft; or
 - has contributed to the construction of a group-built aircraft and has been nominated in writing by that group as the primary builder for the purpose of issuing maintenance releases.

9. Responsibilities of owner-builder when performing maintenance

9.1 If the maintenance is being carried out by an eligible owner-builder then the owner-builder must be the person performing the maintenance and the certifications. This does not preclude the owner-builder from obtaining assistance from others, particularly if he or she feels that a particular task is better suited to the skills, expertise or qualifications available from another individual.

9.2 The owner-builder must manage, oversight, record and certify for the work performed by others and is ultimately the person responsible for the proper completion of all maintenance on the aircraft.

9.3 The primary builder must ensure that all required maintenance work is carried out, and that each maintenance task is carried out and certified by a person authorised in accordance with paragraphs 7.8 and 7.9 of this CAAP.

10. Systems of maintenance for amateur-built aircraft

10.1 The owner-builder or primary builder of the aircraft must ensure that the aircraft has a system of maintenance in place which has been assessed and approved for the aircraft by CASA or an appointed person.

10.2 The system of maintenance may be based on CASA's Maintenance Schedule (Schedule 5 of CAR 1988) or may be a system developed by the owner-builder which is based on the minimum requirements set out in Schedule 5 of CAR 1988. However, it should be noted that Schedule 5 of CAR 1988 is only a schedule and will require additional maintenance instructions to make it a complete maintenance program for the aircraft. Maintenance instructions may be sourced from an engine manufacturer's instructions, a kit manufacturer's instructions or more generic material such as the Federal Aviation Administration AC 43.13.1A and 2A.

10.3 The system of maintenance must also provide for compliance with the requirements of Civil Aviation Order (CAO) 100.5, CAO 108.56 and any relevant Airworthiness Directives (ADs). A list of Australian ADs may be found at:

http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_90822

10.4 The system of maintenance forms part of the experimental certificate issued for an aircraft. If an owner makes a change to the system of maintenance, the changes must be notified to CASA or an appointed person for consideration as to whether the change to the system of maintenance could require changes to operational limitations.

11. Maintenance records

11.1 An aircraft, regardless of certification basis, must have in place a set of continuing airworthiness records, usually known as an aircraft log book, which makes provision for keeping a permanent record of maintenance and modification work that is carried out on the aircraft, its engine(s) and its propeller(s). Maintenance releases are required to be kept as a permanent part of the aircraft continuing airworthiness records. The records must be retained for the life of the aircraft, and if the aircraft is sold they must be passed on to the new owner.

11.2 The maintainer must make a written record in the continuing airworthiness record system for the aircraft of all maintenance that is performed on the aircraft, including details of inspections, rectifications, modifications and component changes.

11.3 For minor rectifications, the maintenance record may be made on the Maintenance Release.

11.4 When larger or more complex maintenance tasks are carried out, the maintenance record should be comprehensively recorded in the aircraft log book. An outline of the maintenance carried out and a return to service certification should also be entered on the aircraft maintenance release.

11.5 When maintenance is carried out which involves disturbance of, or adjustments to, any of the aircraft's control systems, an additional inspection is required to be carried out in accordance with Regulation 42G of CAR 1988.

12. Maintenance certifications

12.1 Each person carrying out maintenance on the aircraft must make a certification in the aircraft maintenance release and/or the aircraft log book that all maintenance has been correctly carried out and that in respect of that maintenance, the aircraft is airworthy.

12.2 The maintenance certification must be signed, dated and include the licence number (if being made by a LAME) or the Instrument number under which an owner-builder is carrying out the maintenance.

12.3 If a duplicate inspection has been carried out in accordance with Regulation 42G of CAR 1988, the certifications must be made in the aircraft log book in accordance with Schedule 6 of CAR 1988.

12.4 Regulation 42G of CAR 1988 requires the person who carried out the maintenance task to inspect the work and certify that the work was carried out in accordance with the relevant approved data and that all systems function correctly.

12.5 Regulation 42G(5) of CAR 1988 requires an independent person to inspect the work and certify that the work was carried out in accordance with the relevant approved data and that all systems function correctly.

12.6 An independent inspection may be carried out by a person who did not carry out the work and who:

- is the builder of the aircraft and authorised to maintain it; or
- is a partial builder who built that part or system being maintained and is authorised to maintain it; or
- holds an aircraft maintenance engineer licence that covers the type of maintenance; or
- is a pilot (other than a student pilot) who is licensed to fly the aircraft.

13. Major repairs and modifications

13.1 If a major repair or modification is carried out on an experimental aircraft, the owner-builder or registered operator must not allow the aircraft to be flown until the repair or modification has been assessed and approved under Part 21M of CASR 1998, or by an appointed person who is authorised to issue a certificate of airworthiness for the aircraft.

13.2 The registered operator or owner-builder must provide the following information to the person making the assessment of the major repair or modification:

- A description of the repair or modification including photographs;
- The reason for the repair or modification; and
- How the repair or modification may affect:
 - the weight and balance of the aircraft;

- the structural strength of the aircraft;
- the performance of the aircraft;
- the operational characteristics of the aircraft;
- other characteristics that could affect the validity of the experimental certificate of the aircraft; and
- why the repair or modification will not affect the safety of the aircraft.

14. Operation related maintenance requirements

Aircraft to be operated by Visual Flight Rules

14.1 The eligible owner-builder may maintain and certify for all electrical, instrument and radio communication and navigation systems provided that he/she is in possession of or has access to all necessary testing equipment and such equipment is calibrated in accordance with a recognised standard.

Note: The information in sub paragraphs 14.2 and 14.3 of this CAAP is included to provide guidance to owner-builders and appointed persons as to what additional equipment and special maintenance may be required if an aircraft is to be operated over populous areas or in Instrument Flight Rules (IFR).

Compliance with the requirements does not automatically entitle the aircraft to be flown in the conditions or airspace that applies. Each operational approval (night Visual Flight Rules, IFR, controlled airspace and flight over populous areas) must be specifically granted by CASA or an appointed person.

Aircraft to be operated in IFR

14.2 Operations under IFR impose special requirements on certain instruments, navigation and communications equipment in order to ensure that all airspace users are able to accurately determine their altitude, speed and position at all times and to report the information as required to ensure that safe separation from other aircraft and from terrain is always maintained. The requirements apply equally to aircraft certified in experimental or with standard category certificates of airworthiness.

14.3 The standards that apply to flight instruments, navigation equipment and communications equipment for operations in IFR are set out in regulations, orders and circulars which are listed below for convenience:

- Regulation 179A of CAR 1988 provides a regulatory power under which CASA specifies navigation requirements for aircraft.
- Regulation 207 of CAR 1988 requires that instruments and equipment fitted to an aircraft must be approved by CASA.
- CAO 20.18 requires that certain instruments must be fitted to an aircraft.
- CAO 20.18 and AIP – GEN set out what navigation and communication equipment must be carried.
- Performance standards or certification requirements for instruments and radio communications and navigation systems are set out in AC 21-46(1) Airworthiness Approval of Avionics Equipment, and AIP-GEN.

- Those items of equipment that are mandated by CAO 20.18 for IFR operations must also meet one of the applicable standards set out in AC 21-46(1) Airworthiness Approval of Avionics Equipment.
- Testing equipment that is used for establishing the accuracy of IFR equipment must be regularly tested for correct calibration. Information about calibration standards is provided by AC 21.35(0) Calibration - Inspection and Test Equipment.

14.4 Aircraft instrument systems and radio navigation and communication systems that are required by a Regulation, Order, or the Aeronautical Information Publication to be carried in an aircraft for operations in IFR must be tested and certified as meeting the required standards of performance and accuracy by a LAME who holds a B2 subcategory licence.

14.5 The remaining maintenance may be performed by the owner-builder and the maintenance release may be issued by the owner-builder once all required maintenance has been completed and the certifications made in the maintenance records.

14.6 If maintenance is required by an AD to be performed in order to verify that any IFR equipment meets required performance standards, then that maintenance must be certified by a LAME who holds a B2 subcategory licence.

14.7 A LAME is not required to certify for matters other than the accuracy and performance standards of the specified equipment at the time of testing. Structural attachments of components, integrity of interwiring and system design remain the responsibility of the owner-builder.

Flight over populous areas

14.8 Flight over populous areas is subject to separate approval under Regulation 262AP (5) of CASR 1998. Approval for such flights is subject to a number of factors, including the aircraft type, its operational history, maintenance schedule, maintenance history of that aircraft and appropriate maintenance certifications.

Executive Manager
Standards Division

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APPENDIX A**MAINTAINER KNOWLEDGE SYLLABUS –
AMATEUR BUILT AIRCRAFT**

1	2	3
Item	Topics and standards	Knowledge levels
1	ICAO and CASA's obligations to ICAO	1
2	CASA priorities	1
3	Role of self-administering organisations	1
4	Australian Aviation Law overall structure	1
5	CARs that apply to maintenance by owner-builders	1
6	CASRs that apply to maintenance by owner-builders	1
7	Responsibility of registered operator	3
8	Responsibilities of maintainer	3
9	Guidance material for operators and maintainers	1
10	Type Certificates	1
11	Special Certificates — amateur-built experimental (ABE) and amateur-built aircraft acceptance (ABAA)	2
12	Maintenance Authorities, and CASR Part 66 Licences	1
13	Systems of Maintenance (SOM) — General	1
14	CASA SOM	2
15	Owner generated SOM	2
16	Log book statement	3
17	Minimum Equipment Lists (MELs)	1
18	Flight manuals and placards	2
19	Maintenance data sources	2
20	CAR 2A approval of data	1
21	Automatic approvals of data from foreign NAAs	1
22	Generic data	1
23	Airworthiness Directives (ADs)	3
24	Service Bulletins, Instructions and Notices	2
25	Major Defect reporting	2
26	Safety Management Systems	1
27	Human factors affecting maintenance	1
28	Safety in the aircraft workplace	1
29	Drugs and alcohol in safety sensitive aviation activities	1
30	Fuelling of aircraft	1
31	Continuing Airworthiness records	2

1	2	3
Item	Topics and standards	Knowledge levels
32	Weight and balance records	2
33	Recording of maintenance	3
34	Coordination of maintenance	2
35	Certification of maintenance	3
36	Duplicate inspections of control systems after maintenance	2
37	Maintenance work sheets	2
38	Aircraft log book	3
39	Maintenance release	3
40	Modifications of aircraft	1
41	Approval of modification and major repair data	1
42	Use and care of calibrated equipment	2
43	Fabrication in the course of maintenance (FITCOM)	2
44	AD/ENG/4 Engine condition report	3
45	Authorised Release Certificate	1

APPENDIX B**KNOWLEDGE OUTCOME REQUIREMENTS****Level 1**

A familiarisation with the principal elements of the topic such that the following objectives are met.

Objectives:

- The applicant must be familiar with the basic elements of the topic.
- The applicant must be able to give a simple description of the topic, using common words and examples.
- The applicant must be able to use typical terms.

Level 2

A general knowledge of the theoretical and practical aspects of the topic and an ability to apply that knowledge, such that the following objectives are met.

Objectives:

- The applicant must be able to understand the theoretical fundamentals of the topic.
- The applicant must be able to give a general description of the topic using, as appropriate, typical examples.
- The applicant must be able to demonstrate awareness of practical applications of the topic.

Level 3

A detailed knowledge of the theoretical and practical aspects of the topic, and a capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner, such that the following objectives are met.

Objectives:

- The applicant must be able to describe the underlying intent and implications of the topic.
- The applicant must be able to give a detailed description of the topic using theoretical fundamentals and specific examples.
- The applicant must be able to explain in detail the theoretical and practical application of the topic.

APPENDIX C**TRAINING COURSE AND TRAINING ORGANISATIONS RECOGNISED BY
CASA FOR THE PURPOSE OF THIS INSTRUMENT**

1. Sport Aircraft Association of Australia Maintenance Procedures Course as approved by CASA.
2. A CASR Part 147 Maintenance Training Organisation that is approved by CASA to provide basic maintenance licence training.

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