



AIRWORTHINESS PRINCIPLE

(COA.02) - Experimental Certificates

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1	Using this Principle document	3
1.1	General	3
1.1.1	An explanation on terms	3
1.1.2	Using Workbook (COA.02) and Principle (COA.02)	3
2	Assessment	4
2.1	Introduction	4
2.2	Assessment scope	4
3	Approval of experimental certificates	4
3.1	Purpose of an experimental certificate	4
3.1.1	Research and development (R&D) – CASR 21.191(a)	4
3.1.2	Showing compliance with regulations - CASR 21.191(b)	5
3.1.3	Training the applicant’s flight crew - CASR 21.191(c)	5
3.1.4	Exhibition - CASR 21.191(d)	5
3.1.5	Air racing - CASR 21.191(e)	6
3.1.6	Market surveys and sales demonstrations - CASR 21.191(f)	7
3.1.7	Operating an amateur-built aircraft - CASR 21.191(g)	7
3.1.8	Operating a kit-built aircraft in the primary category (kits built without Production Certificate supervision) - CASR 21.191(h)	7
3.1.9	Private operations of prototype aircraft - CASR 21.191(i)	8
3.1.10	Light Sport Aircraft - Kit Built LSA - CASR 21.191(j)	8
3.1.11	Other LSA previously issued with a Special Certificate of Airworthiness - CASR 21.191(k)	8
3.2	Registration and marking	9
3.3	Application	9
3.3.1	Review application	9
3.3.2	Letter of authorisation	10
3.3.3	Information to be provided	10
3.3.4	Program letter	10
3.3.5	Additional required information for purpose	12

3.4	Risk assessment	13
3.4.1	Hazard and risk assessment	14
3.4.2	Inspection of aircraft	14
3.5	Flight testing	14
3.5.1	Flight test area	14
3.5.2	Duration	15
3.5.3	Aerobatics	15
3.5.4	Pilot qualifications	15
3.5.5	Flight test program	15
3.5.6	Flight test safety	15
3.6	Issue experimental certificate approval	15
3.6.1	Time limitations	16
3.6.2	Conditions and limitations applied to an experimental certificate	16
3.6.3	Operation over built up areas or operations other than day Visual Flight Rules (VFR)	16
4	Cancellation/ suspension	17
4.1	Surrender	17
5	Definitions for Principle (COA.02)	18
	Revision history	19

1 Using this Principle document

1.1 General

The airworthiness principle document aligns with the associated workbook and provides clarification on the condition statements (questions) provided in the workbook, as well as guidance on how to assess the application considering the specific requirements in each section. To achieve this, the language used aims to encompass the regulatory requirements and CASA's understanding of safe practices including items for consideration that will establish what CASA believes to be a level of safety that is at least acceptable for an approval to be given.

1.1.1 An explanation on terms

Must

When this document states a requirement as a “must”, the term will reference a legislative requirement and as such it cannot be omitted or changed from the stated requirement without further legislative variation or exemption.

Should

The use of the term “should” reflects a requirement that CASA has determined is important to be satisfied that the authorisation is considered to provide a level of safety that is at least acceptable. As these requirements are not specified in legislation, such requirements should be considered only as acceptable means of compliance. Alternate means that can be shown to meet the same intent can be accepted by CASA, an authorised person or a relevant approved design organisation where deemed appropriate. The regulatory basis for these requirements is the regulation 11.055 of CASR. Where alternate methods do not show or meet the same intent, a condition may be placed on the authorisation to compensate and re-establish an acceptable level of safety. The regulatory basis for such requirements is regulation 11.056 of CASR.

It is not acceptable to ignore or omit any “should” requirement that is applicable to the authorisation being assessed without a justification demonstrating the decision retains a level of safety that is “at least acceptable”. Conversely, it is also important to consider whether imposing such circumstances may be inappropriate and unduly onerous on the operator.

May

The term “may” signifies something that is permitted but not required through legislation or deemed important for approval. The term is used to provide options, alternate methods or examples.

1.1.2 Using Workbook (COA.02) and Principle (COA.02)

Workbook COA.02 follows the same numbering reference structure as Chapter 3 of this Principle. e.g. Section 3.2 of this Principle aligns with the same reference section of the workbook. The numbering is sequential to facilitate the cross-referencing between the Workbook and this Principle document.

The Principle document incorporates information from several sources, as well as technical expertise from CASA officers. This assistance aims to facilitate the assessment process by elaborating on regulatory issues and expanding on practices that must, should and may be positively identified to be considered compliant with current legislation.

2 Assessment

2.1 Introduction

As a signatory to the Convention on International Civil Aviation 1944 (Chicago Convention) Australia is expected to uphold the airworthiness requirements set out in the several Articles of the Convention. In particular Article 31 states:

Every aircraft engaged in international navigation shall be provided with a Certificate of Airworthiness issued or rendered valid by the state in which it is registered.

Part II of Annex 8 (Airworthiness of Aircraft) to the Convention requires:

3.2.1 - A Certificate of Airworthiness shall be issued by a Contracting State on the basis of satisfactory evidence that the aircraft complies with the design aspects of the appropriate airworthiness requirements.

CASA can issue experimental certificates to allow specific operations of aircraft which are not by their nature type certificated or have modifications incorporated that are not yet approved.

2.2 Assessment scope

The assessment scope for an experimental certificate involves receiving an application, reviewing aircraft configuration, aircraft documentation and where deemed appropriate performing an aircraft inspection.

Consultation with persons who have expertise applicable to the specifics of the application may be required.

The issuing of experimental certificates for the purposes of research and development and showing of compliance generally requires engineering analysis. In such cases, applications should be directed to the Airworthiness and Engineering branch of CASA or Instrument of Appointment holders that specifically have the authority to issue Experimental Certificates in their scope of approval.

Applications for Amateur Built (AB) and Light Sport Aircraft (LSA) should be directed to the General, Recreational & Sport Aviation branch (GRSA) as the over sighting office of Sport Aircraft Association Australia (SAAA) and the other sport organisations under which most LSA operate.

3 Approval of experimental certificates

3.1 Purpose of an experimental certificate

An experimental certificate for an aircraft may be issued for one or more of the following prescribed purposes per CASR regulation 21.191.

3.1.1 Research and development (R&D) – CASR 21.191(a)

This purpose is primarily intended for bona-fide R&D operations that lead to the subsequent issue of a type certificate, including proof-of-concept flying; or for operations which may be

purely R&D in nature, such as determining whether an idea warrants further investigation. Examples of this activity include testing new aircraft design concepts, new aircraft equipment installations, new aircraft operating techniques, or new uses for aircraft.

Both commercial-built and amateur-built aircraft are eligible for issue of an experimental certificate under this purpose. Operations are limited to genuine R&D activities. An experimental certificate for this purpose is valid only for the period of time specified on the certificate, but not exceeding one year, and for the number of flights necessary to complete the R&D program.

The R&D purpose is essentially a transitory one, and operation under this purpose for an indefinite period is not permitted.

3.1.2 Showing compliance with regulations - CASR 21.191(b)

This purpose provides for operations to show compliance with the CASR or other relevant design codes after completion of testing under the R&D purpose, where a type certificate holder has revised the relevant design data; or where a person has applied for approval of a major modification or design change under a supplemental type certificate (STC).

It also provides for test flying undertaken by CASA as part of a type certification program.

Examples of this purpose are conducting flight tests and other operations to show compliance with the airworthiness regulations, including flights to:

- show compliance for issue of type certificates and STCs
- substantiate major design changes
- verify compliance with the function and reliability requirements of the regulations.

Note: Production test flights are carried out under special flight permits and are not experimental in nature.

An experimental certificate for this purpose is valid only for the period of time specified on the certificate, but not exceeding one year, and for the number of flights necessary to accomplish the purpose.

3.1.3 Training the applicant's flight crew - CASR 21.191(c)

Operations under this purpose are limited to flight crews for whom training in the experimental aircraft is necessary for subsequent operations of the aircraft in type certification programs or for production flight testing.

Except for a manufacturer's first of an aircraft model, do not issue an experimental certificate for purpose of crew training when an equivalent aircraft with a standard certificate of airworthiness is available.

An experimental certificate for this purpose is valid only for the period of time specified on the certificate, but not exceeding one year, and for the number of flights necessary to accomplish the training.

3.1.4 Exhibition - CASR 21.191(d)

Operations covered under this purpose are for valid exhibition purposes only and include operations for the purpose of training for the exhibition or maintaining proficiency. Some examples of this purpose are exhibiting the aircraft's flight capabilities, performance, or unusual

characteristics at air shows, motion picture and television productions, and the maintenance of exhibition flight proficiency, including flying to and from such air shows and productions.

An experimental certificate for this purpose is normally valid for an unlimited period of time. However, operations under this provision are normally limited to a specified area in the vicinity of the aerodrome at which the aircraft is permanently based, or at the venue of the intended exhibition, including flying to and from the venue, and are based on a submitted list of events to be attended.

Exhibition of Ex-armed forces aircraft

Exhibition of ex-armed forces aircraft is not normally provided for under the experimental rules as they should be conducted under the exhibition provisions in regulation 21.189 of CASR (Special certificate of airworthiness for limited category aircraft)

In adherence to this policy, an authorised person or a relevant approved design organisation is not authorised to issue an experimental certificate to an ex-armed forces aircraft for the purpose of subregulation 21.191(d) (exhibition). Certificates for this purpose are only available by making application to CASA using Form 718.

A CASA delegate may issue an experimental certificate to an ex-armed forces aircraft for exhibition however, the applicant will be required to provide details of the proposed exhibition flight. The certificate will be issued for the duration of time necessary to participate in the nominated event.

3.1.5 Air racing - CASR 21.191(e)

An experimental certificate for this purpose is issued for participating in air races, including practicing for air races, and flying to and from racing events. It is normally valid for an unlimited period of time. Operations under this purpose are normally limited to a specified area in the vicinity of the aerodrome at which the aircraft is permanently based, or at the venue of the intended race, and are based on a submitted list of events to be attended.

Ex-armed forces aircraft

Ex-armed forces aircraft that have been extensively modified for the sole purpose of air racing must be operated on an experimental certificate, which will specify on the certificate, the races for which the certificate has been issued.

Ex-armed forces aircraft that have not been extensively modified for air racing may be flown in air races under the provisions of CASR Part 132 - Limited category aircraft and should not be operated on an experimental certificate.

An authorised person or a relevant approved design organisation is not authorised to issue experimental certificates for the purpose of air racing an ex-armed forces aircraft if it has not been extensively modified for air racing.

Air races are not normally conducted in Australia; however, if an operator of an ex-armed forces aircraft wishes to participate in an event and does not have a limited certificate they may apply to CASA for an experimental certificate for the purpose of participating in an air race. The certificate would only be issued for the duration necessary to participate in a nominated event.

3.1.6 Market surveys and sales demonstrations - CASR 21.191(f)

An experimental certificate for this purpose is issued to conduct market surveys and/or sales demonstrations. Issue of experimental certificates for this purpose are confined to:

- a manufacturer of an aircraft manufactured within Australia that is to be used for market surveys and/or sales demonstrations
- a manufacturer of aircraft engines who has altered a type certificated aircraft by installing different engines, manufactured by the manufacturer within Australia, and who then may apply for an experimental certificate for market surveys if the basic aircraft, before alteration, was type certificated in the normal, utility, acrobatic, commuter, primary, intermediate or transport category
- a person who has altered the design of a type certificated aircraft to be used for market surveys if the basic aircraft, before alteration, was type certificated in the normal, utility, acrobatic, commuter, or transport category.

Before an experimental certificate for this purpose can be issued, the applicant must have established a maintenance program for the continued airworthiness of the aircraft and have had the aircraft flown for at least 50 hours, or at least 5 hours if it is a type certificated aircraft that has been modified. An experimental certificate for this purpose is normally limited to the time needed for the prescribed operations and does not exceed one year.

3.1.7 Operating an amateur-built aircraft - CASR 21.191(g)

An amateur-built aircraft where the major portion of which has been fabricated and assembled by a person who undertook the construction project solely for the person's own education or recreation.

Applications for this purpose are also required to complete 'Form 727: Eligibility Statement – Amateur-built Aircraft certifying the major portion was fabricated and assembled for education or recreation, and that evidence is available to support this statement upon request.

CASA Advisory Circular 21.4 provides detailed information regarding amateur-built aircraft and should be referenced if the application is for this purpose.

It should be noted that altering, repairing, or rebuilding a type-certificated aircraft would generally constitute maintenance of the aircraft and not the fabrication and assembly of amateur-built aircraft. In such instances, a CASR Part 21 design approval should be considered such as a Supplemental Type Certificate (STC). The issuing of an experimental certificate should not be used as an alternate method for such purposes.

3.1.8 Operating a kit-built aircraft in the primary category (kits built without Production Certificate supervision) - CASR 21.191(h)

An aircraft in the Primary category that meets the criteria of CASR 21.024(1)(a) and that was assembled by a person from a kit manufactured by a holder of a production certificate for that kit, without the supervision and quality control of the production certificate holder. The boundaries of kit-built aircraft are as follows:

- a. the aircraft is constructed from a manufactured kit that may include some major sub-assemblies and/or pre-assembled components;
 - b. the kit is manufactured by a person holding a Production Certificate (PC) for the kit;
- and

- c. the kit aircraft as a type is certificated in the primary category, but the kit is assembled without the benefit of the PC holder's supervision.

A person assembling an aircraft within the boundaries as described above will then be eligible for an experimental certificate, subject to the requirements of AC 21.4 being satisfied, with the exception that the major portion rule does not apply to kit-built aircraft. The aircraft will be designated Experimental (Kit Built), not Experimental (Amateur-Built). The requirements are listed below, refer to AC 21.4 for more detailed information:

- a. Inspection criteria
- b. Design and construction
- c. Construction kits
- d. Registration and marking information
- e. Identification and registration marks
- f. Certification steps
- g. Aircraft inspection

3.1.9 Private operations of prototype aircraft - CASR 21.191(i)

This purpose provides for limited private use of prototype aircraft that were previously issued with experimental certificates for the purposes of R&D, showing compliance with regulations, and/or exhibition.

Operations of the aircraft are confined to the carriage of maximum 6 occupants, unless otherwise approved by CASA, an authorised person or a relevant approved design organisation. The aircraft cannot be used for compensation or hire. The aircraft is subject to the same limitations and conditions as amateur-built experimental aircraft (see AC 21.4).

A prototype may be eligible for subsequent certification, as a standard category aircraft, if the aircraft has been shown to comply with the applicable airworthiness standards for the category sought, and conformance has been demonstrated throughout the aircraft's construction period.

3.1.10 Light Sport Aircraft - Kit Built LSA - CASR 21.191(j)

There are two types of experimental certificates for LSA. One is for kit built LSA and the other is for aircraft that no longer satisfy the requirements of the Special C of A for LSA. CASA has published dedicated advisory circulars for amateur built and LSA, refer AC 21.4 and AC 21-41 respectively.

Before an experimental certificate for LSA can be issued, the manufacturer should have produced a production aircraft of the same model issued with a Special Certificate of Airworthiness. These aircraft can only be used for private purposes and for flying training of the owner. There is no requirement that the owner should build 51% of the aircraft.

3.1.11 Other LSA previously issued with a Special Certificate of Airworthiness - CASR 21.191(k)

The experimental certificate provides a means for aircraft that no longer comply with the requirements of the Special C of A for LSA (e.g. Non-Compliant Production LSA).

These aircraft can only be used for private purposes and for flying training of the owner. There are a number of circumstances where this could arise such as the production aircraft has been modified without the manufacturer's approval or has not been maintained in accordance with the

manufacturer's requirements. Another circumstance may be that the manufacturer has gone out of business and no suitable persons or organisations have taken over the continuing airworthiness functions for the aircraft.

As with Kit built LSA, the manufacturer should have produced a production aircraft of the same model issued with a Special Certificate of Airworthiness before an experimental certificate for LSA can be issued. CASA has published dedicated advisory circulars for amateur built and LSA, refer AC 21.4 and AC 21-41 respectively.

3.2 Registration and marking

Before an application is submitted for issue of the experimental certificate, the aircraft must be registered on the Australian Civil Aircraft Register or be registered with a sport aviation body (CASR 21.192). In addition to the nationality and aircraft registration marks, as required by Part 45 of CASR, the following markings are also required:

- a. the word 'EXPERIMENTAL' must be displayed on the aircraft in accordance with the requirements of the CASR Part 45 Manual of Standards.

'WARNING

PERSONS FLY IN THIS AIRCRAFT AT THEIR OWN RISK

**THIS AIRCRAFT IS NOT OPERATED TO THE SAME SAFETY STANDARDS AS A NORMAL
COMMERCIAL PASSENGER FLIGHT**

CASA DOES NOT SET AIRWORTHINESS STANDARDS FOR EXPERIMENTAL AIRCRAFT'

- b. the aircraft registration identification plate must be attached to the aircraft per CASR regulation 45.125 and the CASR Part 45 Manual of Standards.

For CAR regulation 262AP, for other than single seat aircraft, a warning placard must be displayed in the cabin or cockpit at a location in full view of all passengers, with the following wording:

Figure 1: Warning example

3.3 Application

3.3.1 Review application

An applicant for an experimental certificate is required to submit an application using Form 718 or Form 682. An incomplete form (including supporting documents) should be rejected.

Along with the application form, the applicant must supply the following information:

- a. a statement, setting forth the purpose for which the aircraft is to be used.
- b. enough data (such as photographs and three-view drawings) to identify the aircraft, and describe the external configuration
- c. If the aircraft is inspected, any information reasonably needed by CASA or the authorised person or relevant approved design organisation to enable it to impose any conditions, including operational limitations necessary in the interests of the safety of other airspace users and persons on the ground or water;

For other than prototype aircraft, e.g. those to be used for air racing or exhibition, this could include a copy of the flight manual/pilot's notes, weight and balance report, aircraft logbooks or equivalent documents, maintenance manual or equivalent document, and a list of the relevant airworthiness directives.

- Where the purposes for certificate issue is operating an amateur-built aircraft CASR 21.191(g) the applicant must provide an eligibility statement using CASA Form 727.
- Where the purposes for certificate issue is operating certain light sport aircraft CASR 21.191(j), the applicant must provide a statement of compliance using CASA Form 681

Note: A program letter or equivalent is recommended to contain the information set out under sections 3.3.3, 3.3.4. and 3.3.5.

3.3.2 Letter of authorisation

If the application is on behalf of the organisation, verify the registered owner of the aircraft provided a notarised letter of authorisation and that the information in this letter is consistent with the application. A true copy of the notarised letter is acceptable.

3.3.3 Information to be provided

Where the purposes for certificate issue are R&D and/or showing compliance, the applicant must provide the information required by CASR 21.193(d). The applicant should provide a program letter that contains the required information as detailed in sections 3.3.4 and 3.3.5.

Where the purposes for certificate issue is operating certain light sport aircraft (3.1.10 above), the applicant must provide the information required by CASR 21.193(e).

For other purposes, it is important that the information provided has sufficient detail to allow CASA, an authorised person, or a relevant approved design organisation to apply the limitations necessary to ensure safe operation of the aircraft.

3.3.4 Program letter

The following provides typical information that should be detailed in a program letter.

Purpose

Verify the program letter clearly describes the purpose for which the aircraft will be used, the purpose of the experiment and that purpose is one listed in CASR 21.191 and meets the requirements of CASR 21.193. The objective is to outline the aircraft configuration and program objectives and not to describe everything in minute detail. The use of the same aircraft for overlapping programs is not precluded, and the program letter can outline one or more programs.

Timeframe for the certificate

Verify the program letter contains the estimated number of flights or flight hours, and the period of calendar time required for the experiment.

Area of operation

Verify the program letter defines the specific area over which the aircraft will be operated, including routes to and from specified airports. A written description or annotated map is acceptable. CASA, an authorised person or a relevant approved design organisation will

establish boundaries of the flight test area and will ensure that hazards to persons on the ground or water are minimised in densely populated areas or congested airways, and the take-off, departure and landing approach corridors.

Civil Aviation Regulation (1988) 262AS refers.

Drawings or photographs

Unless converted from a previously type-certificated aircraft without significant change in the external configuration, verify the program letter includes three-view drawings or three-view dimensioned photographs of the aircraft.

Eligibility

Verify the program letter supports the requested experimental purpose and that purpose is one listed in CASR 21.191. For example, except as provided for under CASR 21.191(f) and 21.195, brokering or marketing of experimental aircraft is not a valid experimental purpose; this includes an individual who manufactures, imports, or assembles an aircraft, and then applies for an experimental airworthiness certificate to help sell the aircraft.

Information for operating limitations

The applicant must outline the aircraft configuration and program objectives, in a manner that will permit CASA, an authorised person or a relevant approved design organisation to prescribe adequate limitations and conditions necessary to ensure safe operation.

Multiple purposes

If the applicant is seeking an experimental certificate for multiple purposes, verify the program letter clearly documents all items listed in section 3.3.5 of this document separately for each purpose. In addition, verify the program letter describes any required configuration changes for changing purposes, to include adding or removing equipment and enabling or disabling systems; required configuration changes are typically specified via the modification or addition of operating limitations. Configuration changes may also require adjustments to the aircraft inspection program. If the applicant intends to use the aircraft for multiple purposes or roles, the program letter should:

1. Document all operations for each purpose.
2. Describe any configuration changes that will occur between each purpose, such as adding or removing external stores and enabling or disabling systems.
3. Include each purpose in a separate section. For example, an aircraft could have an experimental airworthiness certificate for the purposes of R&D and exhibition. CASA, an authorised person or a relevant approved design organisation cannot determine the appropriate certification for the aircraft without knowledge of how the aircraft is used.

‘Crew training’ and ‘market survey’ purposes may be applied for and specified on multiple purpose experimental certificates. These certificates are issued only for the length of time reasonable to accomplish the applicant’s program, and their validity date cannot exceed more than one year.

3.3.5 Additional required information for purpose

Use the following to determine if the information provided by the applicant includes sufficient information to establish whether an applicant is eligible for a specific experimental purpose.

Research & Development

For each project, the program letter should:

1. Describe the project in sufficient detail to demonstrate it meets the regulatory requirements of CASR 21.191(a).
2. Include the number of aircraft required.
3. Include the duration.
4. Include the number of flights and/or flight hours.
5. Describe the area and airports in which the aircraft will be operated.
6. Provide contact information of the customer if the project will be performed under contract.

Exhibition

The program letter should:

1. Provide event names and dates for the events at which the aircraft will be exhibited.
2. Propose route(s) of flight to and from the events.
3. For proficiency and/or maintenance flights, include the estimated number of flight hours and the intended area and airports in which the aircraft will be operated.

Crew Training

The program letter should describe the training plan as follows:

1. For pilot transition training that leads to a pilot authorisation, provide:
 - a. The name of the person within the company who will provide the training and that person's qualifications (for example, instructor pilot training received).
 - b. A training syllabus.
 - c. The time needed to complete the training (that is, approximate number of hours over a defined period of time)
 - d. The estimated number of pilots to be trained, and
 - e. The airport(s) and area(s) of operation where the training will be conducted.
2. For recurrent or revalidation training, provide:
 - a. The name of the person within the company who will provide the training and that person's qualifications (for example, instructor pilot training received).
 - b. When a pilot would need this training (for example, every six months, annually, or after a specified period of inactivity).
 - c. A training syllabus.
 - d. The time needed to complete the training (that is, approximate number of hours over a defined period).
 - e. The performance standards to complete the training, and
 - f. The airport(s) and area(s) of operation where the training will be conducted.

Market Survey.

The program letter should:

1. Describe the market survey in detail.
2. Describe the area and airports in which the aircraft will be operated.
3. Identify intended customers.
4. Specify dates for the market survey activity.

Air Racing

The program letter should:

1. Provide event names and dates for the applicable air races.
2. Include route(s) of flight to and from the races.
3. Describe the area and airports in which the aircraft will be operated for races and for proficiency and maintenance flights.
4. Include the estimated number of hours for proficiency flying and/or maintenance flights.
5. Describe any major alterations that have been made to the aircraft.

Additional Information.

1. Operating Area. A written description or annotated map is acceptable. Specifically describe the area. Stating “Australia” or “worldwide” is not acceptable. Assigning an operating area of “Australia” may be acceptable for low-risk aircraft. CASA, an authorised person or a relevant approved design organisation may establish boundaries of the flight test area, including take-off, departure, and landing approach routing to minimize hazards to persons, property, and other air traffic. However, it is the operator’s responsibility to ensure safe flight of the aircraft.
2. Multiple Purpose Use. If the applicant intends to use the aircraft for multiple purposes or roles, the program letter should:
 - a. Document all operations for each purpose.
 - b. Describe any configuration changes that will occur between each purpose, such as adding or removing external stores and enabling or disabling systems
 - c. Include each purpose in a separate section. For example, an aircraft could have an experimental airworthiness certificate for the purposes of R&D and exhibition. CASA, an authorised person or a relevant approved design organisation cannot determine the appropriate certification for the aircraft without knowledge of how the aircraft is used.

3.4 Risk assessment

The operation of experimental aircraft, especially those flown during the test phases of developmental or modification projects, can involve elevated levels of risk. There are no regulations attempting to control the risks involved or indeed stipulating that an operator of such experimental aircraft carry out the formal risk management procedures.

3.4.1 Hazard and risk assessment

Paragraph 21.193 (c) of CASR requires that an applicant for an experimental certificate provide CASA, an authorised person or a relevant approved design organisation with any information reasonably needed to enable the imposition of conditions or limitations necessary in the interests of the safety of other airspace users and persons on the ground or water. A fundamental hazard analysis risk management process considering the safety of other persons must be conducted.

CASA Advisory Circular AC21-10 Appendix A provides guidance for applicants and for CASA, an authorised person or a relevant approved design organisation who, in the course of contemplating an application for an experimental certificate, need to assess whether information sufficient to satisfy the requirements of CASR 21.193(c) has been submitted.

CASR 21.195A states that CASA, an authorised person or a relevant approved design organisation must issue the experimental certificate if this information has been provided (and the additional requirements of CASRs 21.191 to 21.193 have been met).

3.4.2 Inspection of aircraft

Prior to the issue of an experimental certificate, CASA, an authorised person or a relevant approved design organisation may require an inspection of the aircraft. The applicant should facilitate this on the understanding that such an inspection would only be required to resolve issues associated with the imposition of conditions or operational limitations necessary in the interests of other airspace users, and persons on the ground or water in consideration of the intended purpose(s). The inspection could be carried out by the relevant CASA officer, authorised person or by another entity, for example, an approved maintenance organisation or a Licensed Aircraft Maintenance Engineer, as directed by CASA, an authorised person or a relevant approved design organisation.

3.5 Flight testing

An unproven aircraft is required to be operated in a flight test area. The following information contains a brief outline of the test flight application process. CASA Advisory Circular AC21-10 and 21-47 provide expanded guidance in these areas.

Note: All experimental and developmental flight testing, and the flight testing to prepare the flight test reports submitted to CASA claiming compliance with the applicable airworthiness standards, is the responsibility of the applicant and the applicant's flight test personnel. The CASA Test Pilot (TP) is not the experimental or developmental test pilot.

3.5.1 Flight test area

The area selected by the applicant and submitted to CASA, an authorised person or a relevant approved design organisation for approval should not be over built-up areas of a city or town or in congested airways, so that the flight testing, during which passengers may not be carried, would not likely pose any hazard to other aircraft in the airways or persons on the ground or water. Furthermore, take-off and landing approach paths, and trajectory directions of the aircraft should control of the aircraft be lost, will not be allowed to pass overpopulated areas.

Civil Aviation Regulation (1988) 262AS refers.

3.5.2 Duration

Except for amateur-built aircraft (see AC 21.4), there are no specific time recommendations for operation of an experimental aircraft within an assigned test area. Each case must be judged on the individual conditions, such as the type and complexity of the aircraft.

3.5.3 Aerobatics

Aerobatic manoeuvres may be permitted whilst the aircraft is in the assigned flight test area if, in the judgment of the CASA, an authorised person or a relevant approved design organisation, the aircraft has the capability of such flight. However, these manoeuvres should not be attempted until sufficient flight experience has been gained to establish that the aircraft is satisfactorily controllable.

3.5.4 Pilot qualifications

To carry out flight testing on an experimental aircraft the pilot must have at least a private pilot licence (PPL) with the appropriate endorsements.

Although the regulations do not require the initial experimental aircraft test pilot to have any specific test flying qualifications or knowledge, it would be most unwise for the initial flight tests to be carried out by other than a pilot with such knowledge, especially in the case of a totally unproven design.

3.5.5 Flight test program

The complexity of a flight test program will essentially be a function of the nature of the program, for example:

- a pure R&D program without type certification being involved
- flight testing of a modification
- initial testing of an aircraft destined to carry out exhibition flying and/or air racing
- full type certification of a new aircraft type.

3.5.6 Flight test safety

Some basic flight test safety aspects worth considering during any flight test program are elaborated on in AC 21-10, the aspects to consider are as follows:

- aircrew
- W\work-up
- test planning
- hazard analysis and risk management
- test conduct
- knock it off (KIO)
- crew duty, fatigue, perceived pressure.

3.6 Issue experimental certificate approval

Experimental certificates are issued using CASA Form 720 Special Certificate of Airworthiness.

3.6.1 Time limitations

When issuing a certificate for the purposes of research and development, showing compliance with regulations, crew training, and market surveys, the certificate will be made effective for only the length of time reasonable to accomplish the applicant's program, but not to exceed one year.

'Exhibition' and 'air racing' purposes may be applied for and specified on multiple purpose experimental certificates. However, if any flight testing prior to use of an aircraft in one or both of these purposes is required to be carried out, then the original experimental certificate issued for one or both of the purposes is effective for the period necessary to complete the flight testing, but not to exceed one year. If the testing is not completed within the terms of the certificate, the aircraft must be submitted for re-inspection, and a new certificate issued.

When an exhibition or air racing aircraft has successfully completed its flight testing, the registered operator can then apply for an experimental certificate of unlimited duration. The certificate will show the word 'unlimited' against the expiry block of the certificate and the operating conditions will be revised to reflect those applicable limitations. This paragraph does not infer that unlimited expiry is granted automatically; each case must be evaluated to ensure the request is warranted.

With consideration to the above paragraph, an experimental certificate issued for the purpose of exhibition, air racing, operating amateur-built, kit-built or light sport aircraft or private operations of prototype aircraft (previously issued for purposes of R&D, showing compliance with regulations, and/or exhibition) may have a time limitation applied to the certificate in the interests of the safety of other airspace users and persons on the ground or water. Otherwise, the certificate may be issued without limitation and will continue to be in force until cancelled (refer CASR 195B(2)).

3.6.2 Conditions and limitations applied to an experimental certificate

Civil Aviation Regulation (CAR) 262AP details certain operating limitations that must be applied when issuing an experimental certificate.

Conditions, limitations and directions for operation of an aircraft on special CofA are entered in the Annex to the certificate (Form 720). They should be designed to fit the specific purpose(s) and situations that apply to the aircraft. CASA Advisory Circular AC21-10 Appendices B and C provide standard conditions.

CASA, an authorised person or a relevant approved design organisation may impose any additional conditions, limitations or directions as deemed necessary in the interests of safety of other airspace users, and persons on the ground or water.

The risk assessment discussed at section 3.4 should be considered when imposing conditions or limitations.

Each operating condition, limitation or direction imposed on the certificate should be discussed with the applicant to ensure a full understanding.

3.6.3 Operation over built up areas or operations other than day Visual Flight Rules (VFR)

Civil Aviation Regulation (CAR) 262AP requires the operation of experimental aircraft must not be over built up areas (4) and must be conducted during day and under VFR (6). However, CAR

262AP (5) and (6) does allow for the approval of such operations in certain circumstances (such as flight test).

As discussed in section 3.4, prior to the issue of an experimental certificate a risk assessment is performed to document the risks associated with the operation of an experimental aircraft. The Applicant's mitigation of identified risks informs the conditions and limitations imposed by CASA on the experimental certificate.. All risks must be mitigated to an acceptable level. CASA reviews risk mitigations and imposes conditions and limitations such that granting the authorisation would not be likely to have an adverse effect on the safety of other airspace users or persons on the ground or water.

Commercial considerations such as the increased costs associated with indirect routing to avoid built up areas is not considered relevant in most scenarios.

If an approval is sought for operations over built up areas or operations other than day VFR, the applicant should clearly show the following have been considered.

1. The operation is necessary for the specific purpose for which the experimental certificate was issued, or
2. The operation is necessary in support of the operation for which the certificate has been issued (refer CAR 262AP(2)), and
3. A risk assessment performed in accordance with AC 21-10 appendix A has shown the level of risk to safety of persons and property on the ground or water is considered as low as reasonably practicable.

4 Cancellation/ suspension

Regulation 21.195B allows CASA, an authorised person or a relevant approved design organisation to suspend or cancel experimental certificates. Such action may be taken if maintenance on the aircraft is not carried out in accordance with the applicable requirements, or if CASA, an authorised person or a relevant approved design organisation otherwise considers cancellation/suspension action is warranted in the interests of safety of other airspace users and persons on the ground or water.

A suspension on a certificate is lifted on a date prescribed by CASA, an authorised person or a relevant approved design organisation. If the certificate has been cancelled, either through action as described above, or after an aircraft ceases to be on the Australian civil aircraft register or registered with a sport aviation body (or as identified in Part 149, Approved Sport Aviation Organisation), then the applicant will have to apply for a new certificate.

4.1 Surrender

The holder of an experimental certificate must return the certificate to CASA, on written request from CASA, an authorised person or a relevant approved design organisation if it is no longer in force, expired, suspended or cancelled.

5 Definitions for Principle (COA.02)

Table 1: Term and definition

Term	Definition
Ex-armed forces aircraft	<p>a. a version of an aircraft that has been manufactured in accordance with the requirements of, and accepted for use by, an armed force of any country (whether or not it has been used by such a force); or</p> <p>b. a particular aircraft:</p> <ul style="list-style-type: none"> i to which paragraph (a) does not apply; and ii that has been operated by an armed force of any country. <p>(Source, regulation 132.010 of CASR).</p>
Experimental certificate	<p>An experimental certificate issued under CASR 21.195A. (Source, CASR Dictionary Part 1).</p>
Experimental/developmental flight testing	<p>Flight tests conducted for the purpose of defining or expanding an aircraft's flight envelope.</p>
Flight test	<p>The process of developing and gathering data during operation and flight of an aircraft and then analysing that data to evaluate the flight characteristics of the aircraft. (Regulation 21.035 of CASR refers).</p>
Major portion	<p>As related to an experimental certificate issued for the purpose of operating amateur-built aircraft, major portion means that when the aircraft is completed, the majority of the fabrication and assembly tasks have been performed by the amateur builder(s) who submit the application for certification. The major portion means more than 50% of the aircraft.</p>
Research and development	<p>Testing new aircraft design concepts, new aircraft equipment, new aircraft installations, new aircraft operating techniques, or new uses for aircraft in relation to an experimental certificate. (Source, CASR 21.191 modified).</p>
Special certificate of airworthiness	<p>a. a certificate of airworthiness issued for:</p> <ul style="list-style-type: none"> i an aircraft type certificated in the primary, intermediate or restricted category; or ii an aircraft in the limited category; or iii an amateur-built aircraft accepted under an ABAA; or iv a light sport aircraft covered by regulation 21.186; or <p>b. a provisional certificate of airworthiness; or</p> <p>c. an experimental certificate. (Source, CASR Dictionary Part 1, CASR 21.175 modified).</p>
State of design	<p>The state that issued the applicable Type Certificate related to the application.</p>

Revision history

Amendments/revisions of this Manual are recorded below in order of most recent first.

Version No.	Date	Parts/Sections	Details
1.1	December 2020	Sections 2 and 3	Parts 2.2 - Assessment Scope, 3.2.2 - Conditions and limitations for experimental aircraft and 3.6.3 - Ops over built-up areas
1.0	June 2020	All	First issue