

Advisory Circular AC19-1

Test Pilot Approvals

Revision 2 28 May 2025

General

Civil Aviation Authority advisory circulars (ACs) contain guidance and information about standards, practices, and procedures that the Director has found to be **an acceptable means of compliance** with the associated rules and legislation.

Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

Purpose

This AC describes an acceptable means of compliance for approval as a test pilot for experimental flying or testing of a prototype aircraft.

Related Rules

This AC relates specifically to Civil Aviation Rule Part 19, *Miscellaneous Rules* Subpart I, and Part 21, *Certification of Products and Parts*, Subpart B, *Type Certificates and Type Acceptance Certificates*.

Change Notice

Revision 2:

- updates the name of Part 19 to *Miscellaneous Rules* to align with redrafted rules under the Civil Aviation Act 2023 (CA Act)
- deletes a section outlining the changes made in Revision 1
- moves several long footnotes into the body of the text, and
- makes stylistic and formatting changes to the AC to align with the current style.

In addition, to incorporate changes to the test pilot approval process to require approval of the test plan for Category 1-3 flight-testing activity before application, this Revision makes changes throughout, including:

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- adding new sections:
 - o 4.6.1, Oversight by Part 146 or Part 148 organisations
 - o 4.6.3, Test Pilot Approvals for combined Flight Test Crew, and
 - 4.6.5, Flight Test Activity subject to foreign National Airworthiness Authority (NAA) approval
 - adding a process flow diagram, *Experimental flight test applications overview*, in Section 5, and updating and re-ordering some content.
- adding information to
 - Section 1, *Introduction*, about unmanned aircraft (UA) and unmanned aircraft systems (UAS) and
 - 4.6.2, Approval of Company Test Pilots.

Version History

History Log

Revision No.	Effective Date	Summary of Changes
AC19-1, Rev 0	03 July 2009	Initial issue of this AC.
AC19-1, Rev 1	17 October 2018	Added 'category 4' test pilot approvals which cover all evaluation flying undertaken to obtain another sub-category of special airworthiness certificate (amateur-built, limited and exhibition).
		Identified flight testing activities that did not require a test pilot approval.
		Provided examples of activities across the range of test pilot categories.
AC19-1, Rev 2	28 May 2025	Updates the name of Part 19 to <i>Miscellaneous Rules</i> to align with redrafted rules under the Civil Aviation Act 2023 (CA Act).
		Deletes a section outlining the changes made in Revision 1.
		Moves several long footnotes into the body of the text.
		To incorporate changes to test pilot approval process makes changes throughout, including adding a process flow diagram at section 5 and new sections:
		4.6.1, Oversight by Part 146 or Part 148 organisations
		4.6.3, Test Pilot Approvals for combined Flight Test Crew, and

4.6.5, Flight Test Activity subject to foreign National
Airworthiness Authority (NAA) approval, and
Makes stylistic and formatting changes to the AC to align with the current style.

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1. Introduction

- 1.1 This AC describes the acceptable means of compliance by which pilots may demonstrate their competency to be approved as a test pilot in accordance with (IAW) rule 19.405(1), *Test pilots,* to carry out flight testing or evaluation flying of aircraft that are operating under a Special Category Experimental airworthiness certificate. It defines the various categories of experimental flying and specifies the qualifications and experience that pilots are expected to have to be approved as a test pilot for each category.
- 1.2 For the purpose of this AC, 'aircraft' includes unmanned aircraft (UA) when the characteristics of the unmanned aircraft system (UAS) operation (e.g. in terms of size, complexity and other factors, as per the advice in AC102-1, *Unmanned Aircraft Operator Certification*) require flight test pilot and/or flight test activity approvals. While the activities and requirements described in this AC are focussed on the approval of test pilots for experimental flight testing of manned aircraft, they can be tailored to suit individual applications related to the experimental flight testing of UAS IAW Part 102, *Unmanned Aircraft Operator Certification*.

2. The role and responsibility of an approved test pilot

- 2.1 The primary role of a test pilot is to provide the vital link between the engineers who design and manufacture aircraft and the pilots who will operationally use the aircraft once it is certified. The test flying activities that have been carried out, the quantitative data captured, and the qualitative assessments made by test pilots combine to form the basis on which engineering, operational and safety decisions are made. This requires test pilots to blend the art of flying an aircraft with the science of aeronautical engineering to safely and effectively plan, execute, and report upon their flight testing activities. Prospective test pilots must demonstrate to the Director in their application that they understand the importance of the role and its responsibilities.
- 2.2 To enable a test pilot to show that a new aircraft design or design change complies with the applicable airworthiness requirements, the test pilot should apply their flying skills, experience, knowledge and professional judgement in a methodical, meticulous and dispassionate manner. For design changes to aircraft with Standard or Restricted category Certificates of Airworthiness (CofA) (see AC21-2, *Aircraft certification Airworthiness certificates in the standard and restricted categories*) test pilot are expected to work in combination with a certificated Part 146 Design Organisation and engineers to plan and execute their testing activities in the safest way possible. For other types of CofA, while test pilots may not be required to do this, CAA recommends that they consider it. Test pilots should also be aware of their own capabilities so that they know when they are approaching the limits of their own personal levels of competence. The experience level of the end user should be considered, e.g. in assessing the design change from the perspective of a pilot with the minimum level of qualifications and experience that would allow them to pilot the specific aircraft.
- 2.3 Test pilots operate in an environment that can be inherently risky and prone to external pressures. Therefore, test pilots should be able to recognise the risks associated with their test flying activities and ensure there are adequate systems, procedures and mitigations in place to ensure their flying activities are carried out in the safest possible manner. They should also comprehensively and accurately capture the quantitative data observed and qualitative assessments made during a flight, with enough detail to be a useful record. If an aircraft undergoing test flying fails a particular test point, then the result must be

accurately recorded so that the reasons for the failure can be examined and addressed before a re-test is carried out and any subsequent claim of compliance is made.

- 2.4 It is also very important that test pilots are not affected by commercial pressure or an expectation to achieve a required result when recording their findings.
- 2.5 Meeting these standards in their approach ensures that a test pilot will be fulfilling their responsibilities to the Director and a safe and certifiable outcome is achieved as a result of their test flying activities.

3. Definitions

For the purposes of this AC, the following terms are described:

3.1 Experimental flight testing

- 3.1.1 Experimental flight testing (also referred to as experimental flying or test flying) is a piloted airborne activity that is performed to qualitatively and quantitatively evaluate, determine, validate, verify and/or demonstrate the airworthiness of an aircraft (or its related system/s) and its handling qualities, performance and/or mission suitability and utility.
- 3.1.2 Experimental flight testing is conducted on aircraft operating under a Special Category -Experimental airworthiness certificate. It may be carried out on concept demonstrators, research platforms, prototype aircraft (i.e. a new type or model), or already certified aircraft which have prototype design changes embodied that are in the process of being developed and approved. All experimental flight testing is conducted IAW documented test plans and associated safety plans. For design changes to aircraft with Standard or Restricted category CofA (IAW AC21-2), these plans need to have been developed, reviewed and approved by appropriately qualified flight operations and engineering personnel from a certificated Part 146 Design Organisation or CAA. CAA does not expect flight test plans for special category aircraft to be developed by a Part 146-certificated Design Organisation, although their advice and expertise may be beneficial. See AC21-10, *Experimental Flight Testing Guidance*, for further advice.
- 3.1.3 All experimental flight testing is conducted for one of the following purposes.
- a) Engineering, research and developmental flight testing: These are critical and exploratory testing activities carried out by a participant to investigate the design concept of a prototype aircraft or prototype design change, new operating techniques and/or new uses for aircraft. This testing is also carried out to determine the likelihood of an aircraft design or design change being able to demonstrate compliance with the applicable airworthiness requirements.

This is typically an iterative activity carried out for the purpose of informing the applicant's product development and prompting them to change and refine the prototype during their design process. Examples of these activities include:

- (1) Determining a flight envelope for a new aircraft type which would require engineering, research and developmental flight testing consisting of an extensive test point matrix covering a wide range of test conditions and configurations.
- (2) Test execution to build up from the lowest risk test points well within the to-becertified envelope and conclude with test points that are the highest risk and are

beyond the to-be-certified envelope. As a result of flight test data design changes may be required to correct anomalies or to improve the results achieved.

- (3) Engineering, research and developmental flight testing to provide the participant with sufficient information to create a commercially viable product and be confident that compliance can subsequently be shown with the applicable requirements.
- b) Certification flight testing: These are test flying activities carried out by a participant after completing engineering, research and developmental flight testing to demonstrate that a prototype aircraft type design or prototype design change meets the applicable airworthiness requirements in the New Zealand Civil Aviation Rules¹. CAA may also carry out certification flight testing to independently verify the flight testing results and statements of compliance declared by a participant. CAA flight testing activities would normally be done as part of a type certification project or a complex supplemental type certification project.
- c) **Evaluation flying:** This is any flight testing activity carried out on an aircraft issued with *a special category-experimental* airworthiness certificate for the purpose of demonstrating its airworthiness before issuing another sub-category of special airworthiness certificate (specifically amateur-built, Light Sports Aircraft (LSA), limited and exhibition). Further information regarding the evaluation flying of these aircraft can be found in AC21-3, *Product certification Airworthiness certificates in the special category,* AC21-4, *Special Category-Amateur-Built Aircraft Airworthiness Certificates,* and FAA AC 90.89C.

3.1.4 Experimental flight testing categories

- 3.1.4.1 Due to the scope of experimental flight testing activities these have been divided into several categories, each with corresponding test pilot competence requirements, based on the level of risk and potential complexity associated with the flight testing being conducted. The content and scope of the flight test determines its category, and the flight test category determines the required level of approval for the test pilot.
- 3.1.4.2 The definitions of each category below should be read in conjunction with the examples provided in Annex A. Flight testing of an aircraft that is undergoing a type certification programme should be considered either as Category 1 or Category 2 flight testing until the type has been certified. Flight testing of a design change to an already certified type may be Category 1, Category 2 or Category 3, depending on the extent of the testing required. Flight testing of an LSA undergoing development will be considered Category 1, 2 or 3 depending upon the maturity of the aircraft development and nature of the test flying required.
- a) **Category 1 experimental flight testing:** This category encompasses the experimental flight testing activities that present the highest levels of risk which are critical and/or exploratory in nature. These require advanced pilot techniques, flight test crew rehearsals

¹ Flight testing to show compliance with applicable airworthiness requirements would typically be carried out after developmental flight testing has proven to the participant that compliance can be shown. The applicable NZ rule requirements may cross-reference the FAA Federal Aviation Regulations (FARs), EASA Certification Specifications (CS's) or other acceptable airworthiness requirements.

and dedicated engineering support, such as that required for a new or substantially changed aircraft design undergoing type or supplemental type certification.

- b) **Category 2 experimental flight testing:** This category covers test flying not classified as Category 1 on aircraft which are:
 - (1) non-type-certificated or non-type-accepted aircraft, or
 - (2) type-certificated or type-accepted and have undergone a design change which is yet to be approved, the extent of which may require:
 - (i) the application of special flight test techniques to critically assess the aircraft handling qualities, performance or other flight characteristics, or
 - (ii) an assessment of basic crew procedures and workload, or
 - (iii) intentional flight marginally outside of the aircraft operational envelope but within a previously cleared envelope.
- c) **Category 3 experimental flight testing:** This category covers experimental flying required on previously type-certificated or type-accepted aircraft designs which are subject to design changes that are expected to have no more than a negligible effect on aircraft handling, performance or other flight characteristics, but still require airborne verification to show compliance with the applicable airworthiness requirements. Category 3 test flights are conducted entirely within the established flight manual limits. Should any effect on handling, performance or other flight characteristics that is more than negligible be anticipated during design or discovered during developmental flight testing, then the activity should be considered as being at least Category 2 experimental flight testing. This would likely require reapplication to CAA.
- d) **Category 4 experimental flight testing:** This category exclusively covers evaluation flying undertaken on an aircraft issued with a Special Category Experimental airworthiness certificate for the purpose of:
 - (1) demonstrating its airworthiness to obtain another sub-category of special airworthiness certificate (specifically amateur-built, limited and exhibition)
 - (2) demonstrating the airworthiness of special category aircraft after the incorporation of a modification, or
 - (3) collection of data to substantiate a special category aircraft flight manual.

Note: Category 4 test flights are conducted IAW the operating limitations issued as part of the Special Category - Experimental airworthiness certificate. For further information refer to AC21-3 for limited and exhibition aircraft and AC21-4 for amateur-built aircraft.

4 Test pilot qualifications and experience requirements

4.1 Category 1 test pilot

4.1.1 An individual approved to plan and conduct Category 1 experimental flight testing will be expected to meet the following competency requirements.

4.1.2 Qualifications

4.1.2.1 Requirements include:

- a) graduation from an appropriate course² from a recognised test pilot school³. Test pilot schools other than those listed in footnote 3 may be considered 'equivalent' on a case-by-case basis.
- b) commercial pilot licence, in the case of FAR 23 aircraft or FAR 27 helicopters
- c) airline transport pilot licence for FAR 25 aircraft or FAR 29 helicopters
- d) an instrument rating if appropriate
- e) multi-engine rating if appropriate
- f) extensive formation flying experience if appropriate
- g) an aerobatic rating if appropriate.

4.1.3 Experience

4.1.3.1 Requirements include:

- a) a minimum of 1000 total flight hours across a diverse range of applicable aircraft types and models, with at least 400 hours as pilot-in-command (PIC).
- b) previous experimental flying experience.
- c) experience in flight test programmes in the category for which the candidate is seeking approval to conduct test flying.
- d) recent flying experience of at least 50 flight hours in the previous 12 months, of which 20 hours should be actual flight testing or documented flight test technique proficiency training in any category of aircraft. Instead of the flight hour requirements, candidates can do an experimental test pilot initial or refresher training course within 24 months of the previous approval being issued.

4.1.4 Additional requirements

- 4.1.4.1 Requirements include:
- a) a Class 1 medical certificate

² Graduation from an appropriate course does not necessarily mean an applicant must have graduated from a 12-month long test pilot's course. Graduation from a shorter course would be acceptable if it can be shown that the course is directly applicable to and sufficient for the test flying activity to be undertaken. Alternatively, graduation from a longer course is accepted as providing a knowledge base upon which competence in a broader range of test flying activities can be demonstrated.

³ Test pilot schools recognised by the CAA are Empire Test Pilots' School (ETPS) in the UK, National Test Pilot School (NTPS), US Air Force Test Pilot School (USAFTPS), US Naval Test Pilot School (USNTPS), all in the USA, International Test Pilots School (ITPS), in Canada and EPNER (École du Personnel Navigant d'Essais et de Reception (EPNER), in France, Escola de Formacao em Ensaios em Voo (EFEV), in Brazil, and Indian Air Force Test Pilot's School (IAFTPS), in India.

- b) an acceptable level of understanding of aeronautical engineering principles and the applicable certification requirements, demonstrated by relevant and acceptable flight test plans and/or reports and a successful interview with CAA (see below)
- c) an acceptable standard of technical writing ability, demonstrated by the provision of relevant and acceptable flight test plans and/or reports.

4.2 Category 2 test pilot

- 4.2.1 The scope of experimental flying activities covered by Category 2 is very broad. Therefore, to address the range of competence 'lower than Category 1 but higher than Category 3', the Category 2 competency requirements can be tailored dependent upon the nature and risk of the test flying to be carried out.
- 4.2.2 An individual approved to plan and conduct Category 2 experimental flying would be expected to meet the same competency requirements for Category 1 test pilots, except for the following in 4.2.3:

4.2.3 Qualifications

- 4.2.3.1 While formal training as a test pilot will still be expected, the training need only be applicable for the extent of the required Category 2 experimental flight testing.
- 4.2.3.2 Depending upon the nature of the specific flight testing, formal training requirements may be relaxed. Many test pilot short courses are available, some of which can be tailored to meet specific training needs.
- 4.2.3.3 An example could be a short course focussed on performance or stability and control/handling qualities. Completion of such a course may be considered acceptable for the extent of Category 2 experimental flight testing required.

4.2.4 Experience

4.2.4.1 The previous experience requirements of Category 1 may be reduced but to a level no lower than 750 total flight hours, preferably across a diverse range of applicable aircraft types and models, with at least 300 hours as PIC.

4.2.5 Additional requirements

4.2.5.1 The additional requirements under Category 1 are applicable in relation to the specific certification project.

4.3 Category 3 test pilot

It is expected that an individual applying to carry out Category 3 experimental flying would meet the following minimum requirements.

4.3.1 Qualifications

4.3.1.1 Requirements include:

- a) commercial pilot licence
- b) applicable rating for the general configuration of aircraft to be tested (which may include, but is not limited to: aeroplane, helicopter, instrument rating, tailwheel rating, acrobatic rating, float-plane rating, gas turbine rating, etc.)

- c) a Class 1 medical certificate
- d) attendance at an introductory level flight test short course or seminar appropriate for the flight testing to be conducted. An applicant's previous flight testing experience may be considered sufficient to mitigate the need to meet this requirement on a case-by-case basis.

4.3.2 Experience

4.3.2.1 Requirements include:

- a) a minimum of 500 flight hours as PIC
- b) flight testing experience proportionate to the activity envisaged. While this experience may not be experimental flight tests (as outlined elsewhere in this AC), post maintenance check flights and other similar activity may be used to show suitable experience.

4.3.3 Additional Requirements

4.3.3.1 An acceptable level of understanding of aeronautical engineering principles and the certification requirements applicable to the testing.

4.4 Category 4 test pilot

4.4.1 The range of aircraft subject to evaluation flying activities covered by Category 4 is very broad, with the minimum requirements being dependent upon the category of aircraft being evaluated. It is expected that an individual applying for a Category 4 test pilot approval to carry out evaluation flying of special category aircraft would meet the following minimum requirements:

4.4.2 Qualifications

- 4.4.2.1 Requirements include:
- a) For amateur-built aircraft: Private pilot licence or recreational pilot licence
- b) For limited and exhibition aircraft: Category 3 qualification requirements
- c) For all special category aircraft: Applicable rating for the general configuration of aircraft to be tested (which may include, but is not limited to; aeroplane, helicopter, instrument rating, tailwheel rating, acrobatic rating, float-plane rating, gas turbine rating, etc.)

4.4.3 Experience

4.4.3.1 Requirements include:

- a) For amateur-built aircraft: a minimum of 200 flight hours as PIC
- b) For limited and exhibition aircraft: Category 3 experience requirements
- c) For all special category aircraft: pilots must be in current flying practice in aircraft of the same configuration and performance of the aircraft being evaluated

4.4.4 Additional requirements

4.4.4.1 For amateur-built aircraft, applicants will be required to have a thorough knowledge of <u>FAA AC 90-89C</u> Amateur-built & Ultralight Flight-Testing Handbook. CAA also recommends that applicants develop their knowledge of this handbook, where applicable for limited, exhibition and LSA.

4.5 Subcategory of Special Category Airworthiness Certificate

- 4.5.1 CAA will determine the subcategory of Special Category Airworthiness Certificate which an aircraft is eligible for when they receive the initial application. Eligibility depends on the aircraft certification type and history, and the level of certification will be subsequently reflected in the operating privileges of the sub-category. (See AC21-3 for information on the limited and exhibition categories, and AC21-4 for information on amateur-built aircraft).
- 4.5.2 Reflecting the different operating privileges, it is expected that individuals applying for test pilot approvals for aircraft in the limited and exhibition subcategories would meet the Category 3 test pilot qualification and experience requirements.

4.6 General Notes

4.6.1 Oversight by Part 146 or Part 148-certificated organisations

4.6.1.1 For aircraft with a Standard or Restricted Category CofA, CAA expects that an applicant for a test pilot approval for Category 1 or Category 2 experimental flying would be employed as a test pilot by a certificated Part 146 Design Organisation or a certificated Part 148 Manufacturing Organisation, or acting as a sub-contractor or specialist consultant specifically authorised by those organisations.

4.6.2 Approval of company test pilots

4.6.2.1 A certificated Part 146 Design Organisation and a certificated Part 148 Manufacturing Organisation that are type certificate holders may employ 'company test pilots' as full-time employees or sub-contractors for the purpose of undertaking developmental test flying in relation to further development of the existing certified products identified in their exposition. These individuals will be expected to hold a company authorisation for those activities.

4.6.2.2 Obtaining approvals for company test pilots enables organisations to have a broader scope in testing they can carry out without the organisation having to make repeated individual test pilot approval applications to CAA.

4.6.2.3 This broader scope is subject to audit by CAA, however, and the basis for approval for using company test pilots includes conditions such as:

- a) pilots conducting flight test activities for the [named Part 146 or Part 148 organisation] only
- b) specified aircraft types (and/or models where appropriate)
- c) categories of experimental flight testing included, plus any additional conditions (e.g. up to Category 2, no envelope expansion), and
- d) operating IAW a CAA-approved test plan (noting that if within their scope this could also include approval by a Designated Delegation Holder (DDH)).

4.6.2.4 The logic for issuing this standing company test pilot approval, valid for up to two years and not tied to a specific test plan, is subject to:

- a) the organisation having established procedures for experimental flight testing, which are reviewed in lieu of a test plan
- b) the individual demonstrating currency and recency in test flying practices
- c) CAA maintaining oversight of the test plan (whether directly or via a DDH), and
- ongoing monitoring and surveillance being already carried out via the organisation's Part 146 or Part 148 certification approval process.

4.6.3 Test pilot approvals for combined flight test crew

4.6.3.1 It is possible to apply for test pilot approval as a specific and named flight test crew, usually consisting of one pilot and one flight test engineer. This can be useful in demonstrating that the specific personnel meet appropriate experience requirements. Organisations who would

like this should state this on the test pilot application and list the specific individuals identified in the test plan.

4.6.3.2 When assessing this application, CAA will assess the combined crew for the specific test plan, with the process detailed below applied to the combined crew.

4.6.4 Test pilot approvals for co-pilots

4.6.4.1 When carrying out experimental flying of aircraft with a minimum crew of pilot and copilot, the co-pilot should hold a test pilot approval for at least the next lower category of experimental flying being-carried out. For example:

- a) for Category 1 experimental flying, while the PIC must hold a Category 1 approval, and the co-pilot should hold at least a Category 2 test pilot approval, but
- b) if conducting Category 3 experimental flight testing, while the pilot must hold a Category
 3 approval, the co-pilot need not hold a test pilot approval.

4.6.5 Flight test activity subject to foreign National Airworthiness Authority (NAA) approval

4.6.5.1 Situations may arise where an applicant wishes to conduct flight testing of a foreignregistered aircraft in New Zealand's airspace, or conversely, conduct testing of a New Zealandregistered aircraft in a foreign NAA's airspace. In these instances, the requirements of both the aircraft State of Registry and State of Operation need to be met. If the design change is being conducted under the authority of a separate State of Design, then that State of Design also has jurisdiction over whether the testing is acceptable for the design change's demonstration of compliance.

4.6.5.2 In these cases CAA's focus will be on coordinating with the foreign NAA(s) to assure that:

- a) the State of Registry has approved the airworthiness of the aircraft (e.g. via an experimental airworthiness certificate)
- b) the State of Operation has approved the foreign registered aircraft to operate in its airspace (e.g. via a special flight permit), and
- c) the State of Design has approved the flight testing required to be carried out (e.g. via acceptance of the flight test plan).

Note: Each NAA has its own processes for issuing experimental airworthiness certificates and for this reason they are not recognised as being issued in accordance with ICAO Annex 8 requirements. This should be stated on the document with the wording that permission is required for flight over any foreign country. This means the State of Operation has the sovereign right to issue its own additional requirements beyond those in the State of Registry's experimental airworthiness certificate.

4.6.6 Flight test risk management

4.6.6.1 FAA Order 4040.26 Appendix C, while written for the FAA Aircraft Certification Directorate, documents what is considered to be acceptable guidance relating to risk management practices for experimental flight testing activities. This information should be tailored by participants to reflect the specific test flying activities being undertaken. Further guidance can be found in AC21-10 and CASA AC21-47.

4.6.7 Type ratings

4.7.7.1 As aircraft undergoing flight testing are operating under a Special Category - Experimental CofA (airworthiness certificate), test pilots approved under rule 19.405 need not be rated on the specific aircraft type to carry out experimental or evaluation flying activities (Refer to rule 61.55(b)(2) and AC61-10).

5 Test pilot approval process



Effective date: May 2025

Figure 1 – Experimental flight test applications overview

5.1 Process overview

Approval as a test pilot follows a specific process which is dependent upon the category of the experimental flying that the organisation proposes to carry out. The normal sequence of events is outlined in the following sections, and there is more information at <u>https://aviation.govt.nz/flight-test.</u>

5.2 Category 1-3 applications

Before applying for Category 1 to 3 test pilot approval, applicants are expected to have received notification of their test plan being accepted. This is usually submitted for assessment via application for a Special Category - Airworthiness Certificate on the applicable CAA form. To find this form, go to the 'Forms' tab on the CAA website, click on the filter for Part 21, then search for 'Application for special category airworthiness certificate (experimental)'.

- a) For special cases where this is not required (such as large UA, or revision to a test plan while the aircraft's experimental CofA remains valid), a test plan can be submitted directly to the Certification mailbox at certification@caa.govt.nz requesting its review. This is chargeable activity.
- b) The test plan should describe the nature of the proposed experimental flying as completely as possible and nominate the test pilot(s) (as per AC21-10). In determining which category of test pilot approval to apply for, applicants should first determine if the flight test falls within the definition of Category 1, before moving sequentially through the definitions of Categories 2 and 3, until the correct Category is determined. Annex A provides additional information to assist with this process.

5.3 Category 4 applications

a) Before applying for Category 4 test pilot approval, applicants are expected to have received confirmation of the subcategory of Special Category Airworthiness Certificate the aircraft is eligible for. Eligibility depends on the aircraft certification type and history. The level of certification will be subsequently reflected in the operating privileges of the sub-category. (See AC21-3 for information on the limited and exhibition categories, and AC21-4 for amateur-built aircraft). This is usually submitted for assessment via application for a Special Category - Airworthiness Certificate on the applicable CAA form. To find this form, go to the 'Forms' tab on the CAA website, click on the filter for Part 21, then search for 'Application for special category airworthiness certificate ([insert Category e.g. LSA])'

5.4 Experimental Test Pilot Applications

a) Having reached the point in the process to apply for Test Pilot Approval (See Figure 1), applicants need to apply on the applicable CAA form. To find this form, go to the 'Forms' tab on the CAA website, click on the filter for Part 19, then search for 'Application for test pilot approval - experimental flying'. Applications must be completed and submitted to the Director, along with the supporting evidence required. This can be done via the Licensing & Standards mailbox at pft.admin@caa.govt.nz.

5.5 Documentation

- a) Each proposed test pilot (or combined flight test crew as per Section 4.6.3) should complete an application form. Depending upon the extent of experimental flying that organisations need to carry out, it may be possible for different categories of test flying to be undertaken by different test pilots during the same certification project. If this is part of the planned approach, the test plan should detail this.
- b) Supporting documentation such as curriculum vitae (CVs), certificates and evidence of currency should be attached with the test pilot application.

5.6 Review of application

Once a complete test pilot application is received, CAA will firstly review:

- a) the application against the provided CAA-accepted flight test plan to ensure the test pilot category classification is appropriate for the activity being applied for.
- b) the applicant's qualifications and experience against the minimum requirements specified for the category of experimental flying applied for.

Note: Experimental Flight Test Category 4 applicants are expected to meet Category 3 test pilot qualification and experience requirements for aircraft that will operate in the Limited and Exhibition subcategory Special Airworthiness Certificate post flight testing. Justification of alternative experience, if applicable, should be made in the application form.

CAA will then notify:

- a) applicants who meet the minimum requirements specified for Category 1 or 2 experimental flying as appropriate for the experimental flying to be undertaken and make arrangements for the applicant to undergo an interview and check flight (if required).
- b) applicants who meet the minimum requirements specified for a Category 3 experimental flying as appropriate for the experimental flying to be undertaken.
- c) applicants who do not meet the requirements for any of the 4 Categories of experimental flying, with details of those areas where the applicant is deficient.

5.7 Interview

5.7.1 Every applicant for a test pilot approval for Category 1 and normally all applicants for a Category 2 test pilot approval will be interviewed by CAA or a designated representative. The venue and method of interview will be agreed between the applicant and CAA. As per Section 4.6.3, combined flight test crew applicants will be assessed together as a crew.

5.7.2 A range of questions relevant to the activity may be asked but it is likely the applicant will be required to outline a proposed experimental flying programme and describe the anticipated procedures, techniques, potential flight safety risks and the management of these. The applicant's knowledge of the applicable certification requirements will be examined, as will their experience, qualifications and overall competence to hold the approval requested.

5.7.3 Based on the interview, CAA will assess whether or not the applicant is suitable for the proposed activity. If the applicant is unsuccessful at the interview stage, the applicant will be informed accordingly.

5.8 Practical evaluation

5.8.1 Following successful completion of the interview stage, an applicant for a test pilot approval for Category 1 or Category 2 experimental flight testing may be required to carry out a practical simulator or flight evaluation with CAA to ascertain the applicant's technical and flying proficiency for the proposed experimental flight testing.

5.8.2 It is the responsibility of the applicant to provide a simulator or aircraft that is suitable to be used for the practical evaluation. The applicant will be the PIC throughout the practical evaluation. CAA will provide a reasonable flight test scenario so the applicant can prepare. As per Section 4.6.3, combined flight test crew applicants will be assessed together as a crew.

5.8.3 The practical evaluation will be conducted on an aircraft type that the applicant is rated on and familiar with, and will be of similar configuration to that planned for the experimental flying for which the applicant is seeking approval. The applicant will be asked to demonstrate skills or techniques that will be required during the planned experimental flight testing and CAA will assess the applicant's airmanship, practical application of flight testing principles and of flight test risk management practices. It is likely that the applicant will be required to prepare a flight test plan before the check flight and provide a verbal debrief and written flight test report documenting the results of the practical evaluation afterwards.

5.8.4 An applicant for a test pilot approval for Category 1 or Category 2 experimental flight testing who is a graduate of a recognised test pilot school may not be required to carry out the check flight, depending on the applicant's experience. However, CAA may still require evidence of technical writing ability, typically in the form of test plans or test reports, to be submitted.

5.9 Approval

5.9.1 Once the process detailed above has been completed satisfactorily, the Director may approve the applicant as a test pilot by issuing an approval in writing. If an application is unsuccessful, the applicant will be informed of the decision in writing with the reasons stated.

5.9.2 All test pilot approvals will be issued for a maximum period of two years, with a typical validity period being six months to conduct the flight test activity. Test pilot approvals issued by CAA may include limitations in duration and/or scope as is deemed appropriate. For example, approvals could be issued with limitations in relation to a specific activity or programme for a specific aircraft registration.

5.9.3 Dependent upon the application, approvals for test pilots employed by a certificated Part 146 or Part 148 organisation who are type certificate holders, or for test pilots who regularly undertake Category 4 evaluation flying may be issued in relation to a specific certification project or be more general in scope.

5.9.4 Once approved as a test pilot under rule 19.405, the pilot may perform that experimental flying for which the pilot is approved, subject to CAA oversight and audit as necessary.

5.9.5 Renewal of a test pilot approval would initially involve CAA reviewing activities done during the preceding period, and then as much of the normal issue process as is appropriate based on the results of the review.

6 CAA audit of experimental flight testing

- 6.1 The grant of a test pilot approval does not give the successful applicant or organisation the authority to perform prototype testing or experimental flying, without appropriate CAA involvement in the design approval process and the organisation showing compliance with the applicable provisions of Parts 21 and Part 91, *General Operating and Flight Rules*. CAA may audit any experimental flying activities conducted in support of certification projects to verify the accuracy and quality of the reported data, adherence to agreed plans and the management of flight test risks. The size and scope of these audits will be determined by the nature and complexity of the certification project and also the quality, accuracy and reliability of the reports submitted to CAA for review.
- 6.2 These audits may include CAA:
- a) reviewing flight test plans and procedures

- b) reviewing flight test risk management plans, practices and implementation of risk mitigation strategies
- c) witnessing of test flights
- d) reviewing test reports and data presented
- e) flight testing, which may comprise of a re-test of selected test points through to a complete re-test of the entire flight test programme

Note: A complete re-test would only be required in cases where the submitted data is unacceptable due to it being found either incomplete, inaccurate, or potentially misleading or false.

- f) employing a test pilot to provide specific flight testing expertise for the conduct of CAA flight testing, and
- g) reviewing any other aspect of the operation, as needed.

7 Flight testing not requiring CAA approval of a test pilot

7.1 Overview

The activities listed below, while test flying by their very nature, do not have to be conducted on aircraft operating under a Special Category - Experimental airworthiness certificate for the aircraft. Therefore, a test pilot approval for these activities is not required under rule 19.405 and they are not defined as experimental flight testing as per Section 3.1. However, when doing these activities there is still a greater potential of encountering problems than in normal day-to-day flying activities. Therefore, methodical planning and thorough risk management is essential to ensuring that safety is maintained during the conduct of these activities.

7.2 Production flight testing

- 7.2.1 Also known as post-production or production acceptance test flying, this activity is flight testing of newly-manufactured type-certificated aircraft with the aim of demonstrating that they conform to their certified type design. As the aircraft type is already certified, the behaviour of the aircraft is known.
- 7.2.2 Production test flying is to be carried out IAW documented procedures which should be detailed in the certificated Part 148 Manufacturing Organisation's exposition.
- 7.2.3 A production test pilot will require a licence and rating appropriate to the aircraft type and it is expected that they will be competent and formally authorised by the certificated Part 148 Manufacturing Organisation to carry out the defined flight testing.

7.3 Post-maintenance flight testing

7.3.1 Also referred to as an 'operational flight check' (as per rule 91.613, *Operational flight check*) or a 'maintenance check flight', post-maintenance flight testing is carried out at the end of a maintenance activity under a release-to-service (RTS) for the specific flight test activity to confirm that the flight characteristics of the aircraft have not changed as a result of the maintenance activity. Post-maintenance flight testing should be carried out IAW instructions issued by the aircraft manufacturer or IAW company procedures in the case of a maintenance organisation or an air operator.

7.3.2 While not requiring a test pilot approval under rule 19.405, as a minimum a pilot carrying out an operational flight check must be appropriately licensed and rated for the subject aircraft. For Part 119/125 or Part 119/121 operators, pilots carrying out post-maintenance flight testing are also be expected to hold a company authorisation for those activities.

7.3.3 The Flight Safety Foundation's 'Functional Check Flight Compendium' is considered to provide relevant information for companies and individuals conducting operational flight checks. This is available at: <u>https://flightsafety.org/toolkits-resources/functional-check-flights/</u>.

Note: If a yet-to-be approved modification was installed during a maintenance activity, then the aircraft no longer conforms to its approved configuration. Any flying conducted prior to the modification being approved cannot be considered an 'operational flight check'. In such circumstances the aircraft must be issued with a special category-experimental airworthiness certificate and flight testing must be conducted by a test pilot approved under rule 19.405 until such time as the modifications are approved (post-installation validation flights conducted after installing a modification under AC43-14 are an exception to this, see below).

7.4 Post installation validation flights under AC43-14

7.4.1 AC43-14, *Standard Design Changes - Acceptable Technical Data*, identifies the potential need for validation flights to confirm no-interference between avionic systems after the installation of a system. The PIC conducting the validation flight for a modification conducted IAW AC43-14 is not required to hold a test pilot approval when these validation flights are conducted under Day VFR conditions.

8 Correspondence and forms

8.1 Correspondence relating to test pilot approvals can be sent to the CAA at the following address marked for the attention of the Licensing and Standards Unit:

Civil Aviation Authority

PO Box 3555

Wellington 6011

New Zealand

Alternatively, prospective applicants and applicants can email CAA at: pft.admin@caa.govt.nz

8.2 The forms referred to in this AC can be obtained from the CAA website: <u>www.caa.govt.nz</u> under the 'Forms' tab.

9 Charges

9.1 Applications for test pilot approvals will be assessed in accordance with the applicable Civil Aviation Charges Regulations. To find the current fees and charges, as well as the applicable Regulations, check the *Fees, levies, and charges* page on the CAA website:

https://www.aviation.govt.nz/about-us/what-we-do/how-we-are-funded/fees-levies-andcharges/

A1 Annex A: Examples of Categories 1, 2, 3 and 4 Flight Testing

- A1.1 This annex presents a non-exhaustive list of examples of test flying activities to assist applicants to determine what category their test pilot approval application should be for. These examples should be viewed in conjunction with the definitions of each category provided in the body of this AC.
- A1.2 In determining which category of test pilot approval to apply for, applicants for categories
 1, 2 or 3 should first determine if the flight test falls within the definition and examples of
 category 1 before moving sequentially through the definitions and examples of categories
 2 and 3, until the correct category is determined.

Note: Once an approval has been issued for a particular category of test flying, approved test pilots should continually assess whether the results of the test flying continues to justify the assessment made. Unexpected flight test results may justify a re-categorisation of the test flying activity. In particular the definition of Category 3 flight testing includes 'no more than a negligible effect on aircraft handling, performance or other flight characteristics'. Hence if an effect is identified during testing, then this automatically becomes category 2, usually requiring reapplication to CAA.

A1.3 Category 1 flight testing examples

A.1.3.1 These include:

- a) Full aero-servo-elastic and flying qualities envelope expansion of a new type where the flight envelope has not yet been established, or is in the process of being opened beyond previously investigated limits.
- b) Fixed-wing aircraft: Initial high-speed taxi, high-speed aborts, first flights, VMCG, VMU, initial stalls, departure and spins.
- c) Rotary-wing aircraft: Determination of H/V diagrams and category A take-off and landing profiles.
- d) All types: Where the encounter of surprising or even hazardous flight characteristics can be expected such as assessing failures or degradation of critical systems.
- e) Aircraft handling and initial performance flight testing in conditions where one or more of the following parameters is approaching the previously investigated limits of the aircraft envelope: altitude, attitudes, weights, CG position, speed/Mach, stalls, temperature, engine and aerofoil performance.
- f) Where the embodiment of new systems is anticipated to significantly affect the aircraft's airworthiness, flying qualities or performance characteristics.
- g) When the crew of the chase aircraft has the duty to assist the prototype aircraft crew in recovering from a critical flight situation (i.e. assist the crew in the aircraft subject to spinning in assessing the spin or triggering recovery actions).

A1.4 Category 2 flight testing examples

A.1.4.1 These include:

- a) Flight testing within an envelope that has already been opened and it has been demonstrated that the general behaviour of the aircraft is adequately safe and there are no potentially unsafe flight characteristics identified within the opened envelope.
- b) All-engines-operating climb performance.
- c) Cruise performance.
- d) Static stability demonstration.
- e) Function and reliability flights.
- f) Initial night vision imaging system (NVIS) installation assessments where workload assessment and amendment to or creation of Standard Operating Procedures is required.
- g) Systems tests of autopilot or guidance/warning systems such as Terrain Awareness and Warning System (TAWS) or Airborne Collision Avoidance System (ACAS), when the modes themselves are tested, requiring operating the aircraft by deviating from the standard operational procedures.

Note: In the case of embodiment of such systems on an already certified aircraft, when the system integration in an existing cockpit requires a more global crew procedure assessment (e.g. the system has been integrated in cockpit screens and a centralised warning system which requires a new cockpit procedure assessment) some tests may fall under category 3; see below.

A1.5 Category 3 flight testing examples

- A1.5.1 Those test flights required to demonstrate compliance of 'yet to be approved' design changes with the applicable airworthiness requirements which should have no more than a negligible effect on the handling, performance or other flight characteristics of the aircraft and do not require the aircraft to be flown outside of the already approved flight manual envelope and limitations.
- a) Part 25 or Part 29 aircraft interior/cabin conversion/installations that do not incorporate new role-specific equipment.
- b) NVIS evaluation following a change which has a minor effect on an already approved NVIS cockpit and does not require workload assessment.
- c) Any of the following design changes that are not implemented IAW AC43-14, *Standard Design Changes Acceptable Technical Data:*
 - (1) Emergency Locator Transmission (ELT) installation.
 - (2) New/upgraded in-flight entertainment system installation.
 - (3) SATCOM and telephone installation.
 - (4) New radio equipment installation.
 - (5) Guidance/warning systems which are not category 2 and for which demonstration of correct functioning in-flight is required.

Note: There may be design changes as a result of tests which, despite the fact that they have no influence on the behaviour of the aircraft, require flying in conditions which deviate significantly from the standard operational use of the aircraft. These unusual flight test conditions may require classifying the flight as Category 2, see paragraph below.

A1.6 Flight testing requiring deviation from Standard Operating Procedures

- A1.6.1 While a design change may be anticipated to have a negligible impact on handling, performance or other flight characteristics, demonstrating its compliance may require flight tests that include operating significantly outside of the standard operational use of the aircraft. These unusual flight test conditions may require classifying the flight testing as Category 2. For example, a design change made to an already certified TAWS which requires flight testing at very low altitude and/or towards high terrain.
- A1.6.1 Such testing may be classified as a Category 3 on a light aeroplane or helicopter, because the flight test is performed in the normal operating domain of the aircraft. However, the same flight test performed with a transport category aircraft, especially if it needs to be flown in clean configuration significantly below gear and flaps warning heights, should be classified as Category 2. This is because such a flight does not correspond to the normal use of the aircraft and needs to adopt specific testing procedures, and as a result, the pilot must demonstrate competence to Category 2 requirements specific to the testing.

A1.7 Category 4 flight testing:

- A1.7.1 This covers all evaluation flying of amateur-built, LSA, limited and exhibition aircraft conducted IAW the operating limitations issued as part of the special category-experimental airworthiness certificate for the purpose of:
- a) Demonstrating the airworthiness of an aircraft to obtain another sub-category of special airworthiness certificate (specifically amateur-built, LSA, limited and exhibition).
- b) Demonstrating the airworthiness of special category aircraft after the incorporation of a modification.