# Unmanned Aircraft System Operations in UK Airspace – The UK Recognised Assessment Entity

**CAP 722B**

The latest version of this document is available in electronic format at www.caa.co.uk/cap722b

# Contents

# Revision History

**Note:** Changes made since the previous published edition are notified in red underline.

## Fourth Edition                                                                                   May 2023

This revision has been issued to include amendments to the oversight process and an introduction to Performance Based Oversight Principles.

## Third Edition                                                                              December 2022

This revision has been issued to include amendments following publication of the UK Acceptable Means of Compliance and Guidance Material for Regulation (EU) 2019/947 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

## Second Edition                                                                            December 2019

This edition takes into account the introduction of the harmonised European Union (EU) Unmanned Aircraft Systems (UAS) Regulations, which become applicable on 1 July 2020, and adjusts the scheme accordingly in preparation for this date.  In line with international developments, the naming of the National Qualified Entity (NQE) has been changed to Recognised Assessment Entity (RAE).

## First Edition                                                                                    July 2019

Initial issue.  Information has been extracted and modified from Appendix E of CAP 722 Sixth Edition March 2015 and updated where appropriate in accordance with the regulatory changes within ANO 2016 and subsequent amendments.

# Foreword

## Purpose

This document contains the requirements, administrative processes, instructions and guidance related to the operation of the Recognised Assessment Entity (RAE) scheme within the United Kingdom.  It also describes the related remote pilot examinations and practical flying tests that will be administered under the RAE scheme.  It is primarily intended for the use of organisations that are, or wish to be, approved as an RAE.

## Content

The subject matter within this document provides the information necessary to ensure compliance with the relevant Unmanned Aircraft Systems (UAS) regulation within the UK. Where appropriate, the content of this document has also been harmonised internationally.

## Availability

The latest version of CAP 722B can be located within the 'Publications' section of the CAA website (CAA Publications),  or directly via www.caa.co.uk/cap722b .

Updated information can be found within the 'latest updates' section of the CAA website's UAS webpages www.caa.co.uk/uas .

The CAA also provides a more general aviation update service via the SkyWise system, which can be filtered by subject matter for relevant UAS related information.

## Structure

CAP 722 is a series of UAS guidance documentation published by the CAA, which can be found here.

# Point of Contact

Unless otherwise stated, all enquiries relating to CAP 722B must be made to:

GA & RPAS Unit
CAA
Safety and Airspace Regulation Group
Aviation House
Beehive Ring Road
Crawley
West Sussex
RH6 0YR

E-mail:        uavenquiries@caa.co.uk

# Abbreviations and Glossary of Terms

The definitive list of abbreviations and terms/definitions that are relevant to UAS operations within the UK and for the whole CAP 722 'series' of documents are centralised within CAP 722D UAS Definitions and Glossary.

# CHAPTER 1 | General

# 1. General

## 1.1.    The Recognised Assessment Entity (RAE) Scheme

The Recognised Assessment Entity (RAE) Scheme has been developed to assist the CAA in assuring the competence of remote pilots for many of the 'large volume' VLOS operations that require an operational authorisation.  The CAA approves RAEs to assess the competence of remote pilots against a specific set of requirements and to issue the appropriate certificate on the CAA's behalf.  The names of all approved RAE organisations are published on the CAA's website.

The competency of the personnel involved in the operation of an unmanned aircraft is a primary factor in ensuring that unmanned aircraft operations remain tolerably safe.  Within any UAS operation, a focus is placed on the competency of the remote pilot.

UAS regulations follow 3 basic concepts in that they are operation centric, risk based, and performance based.  The fundamental principle in these concepts is the safety risk that an unmanned aircraft's flight will present to uninvolved third parties.  UAS operations will fall into one of three categories; Open, Specific or Certified.

While the basic remote pilot competency requirements for operations within the Open category are covered by the successful completion of the CAA's 'Drone and Model Aircraft' online competency test[1], operations within the A2 subcategory require an additional remote pilot qualification, as do certain operations within the A1 subcategory until 01 January 2026.   Similarly, within the Specific category, although competency can be addressed within the operational risk assessment (OSC), operations that are conducted under a pre-defined risk assessment (PDRA) will include prescriptive details of the level of the remote pilot competency required for compliance.

Competency requirements are combined into a series of 'remote pilot certificates', further details of which can be found in the applicable Annexes of this document.

The UK remote pilot competency scheme consists of two certificates as follows:

- The '**A2 Certificate of Competency**' (A2 CofC) – This is a theoretical examination, conducted at an RAE test facility.  The A2 CofC satisfies the Open category requirements for operations within the A2 subcategory, as well as the 'Transitional' elements of the A1 subcategory that apply until 01 January 2026 (as detailed in Article 22 of UK Regulation (EU) 2019/947).

- The '**General VLOS Certificate**' (GVC) –This comprises both a theoretical

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[1] Or an equivalent competency test as prescribed within UAS.OPEN.020 (4)(b) of Regulation (EU) 2019/947

examination and a practical flight test, conducted at an RAE facility.  The GVC satisfies the requirements for VLOS within the Specific Category.  The GVC satisfies the competency requirements of a published PDRA that involves VLOS flight.

In some cases, these certificates may also be considered appropriate for some operations conducted under an operational risk assessment (e.g. an A2 CofC may prove sufficient in cases where the operation entails flight at reduced distances from uninvolved persons).

## 1.2.    Scope

A UK RAE is an organisation that has been formally approved by the CAA to submit reports and/or issue certificates on the CAA's behalf in relation to the competency of remote pilots.

RAEs are approved by the CAA under the authority of Article 268 of the UK Air Navigation Order 2016 (the Order) and as such the approval is bounded by the limits of UK legislation.  RAE organisations should note that approvals granted to them under this scheme are UK national approvals only and do not confer any form of additional approval under European legislation other than the certificates they issue.  Specifically, a UK RAE is not a Qualified Entity as defined in Article 61 of Regulation (EU) 2018/1139 ('The Basic Regulation').  The UK CAA's RAE approval is limited to organisations whose primary trading address is in the UK.

This document sets out the requirements to be met by organisations seeking UK national approval as an RAE.

RAE applicants will be required to demonstrate their organisation's ability to train and assess the competence of remote pilots, based on a theoretical knowledge examination and, where relevant, a practical flight assessment.  In addition, applicants are required to demonstrate that they have appropriate procedures for the assessment of operations manuals and to make recommendations for the issue of an operational authorisation for those UAS operations that are covered by pre-defined risk assessments.

## 1.3.    Privileges

An RAE shall be entitled (within its terms of approval) to report to the CAA that a remote pilot has demonstrated the appropriate levels of remote pilot competency corresponding to the certificate being issued and to issue that certificate to the remote pilot.  Where this report also includes a satisfactory assessment of the UAS operator's operations manual in association with a pre-defined risk assessment scenario, an RAE's report (recommendation) may be immediately accepted by the CAA for the grant of an operational authorisation.

An RAE is not required to verify a remote pilot's theoretical competency when that person is using any of the acceptable alternatives that fulfil the remote pilot competency criteria elements detailed in CAP 722. Acceptable evidence of these 'critical elements' should be submitted to the CAA by the individual applicant when he or she applies for an operational authorisation.

## 1.4.   Obligations

The holder of a UK RAE approval shall:

- Ensure that the exposition and the documents to which it refers are used as basic working documents within the organisation;

- Maintain the organisation in conformity with the procedures specified in the RAE approval;

- Ensure that any manuals, instructions or procedures used for the assessment of remote pilots are reviewed periodically and approved either by the organisation or the CAA as appropriate.

The RAE must keep the following records for a period of five years:

- A record of each student's:

    - Theoretical assessment;

    - Practical flight assessment;

    - Operations manual assessment.

        **Note:** *Records should include details of any failed examination/test attempts.*

- Full details of any remote pilot competency certificate that has been issued;

- Any recommendation made to the CAA;

- A record of each quarterly formal, periodic internal safety review/meeting and any subsequent follow-up actions.

These records must be stored in a secure manner to ensure that no damage to, or tampering of, records can occur.

The RAE must provide the CAA with the following monthly and upon request:

- A list of all A2 CofC certificates that have been issued during that month;

- A list of all GVC certificates that have been issued during that month;

## 1.5.   Transferability

Approval as a UK RAE is not normally transferable but may be considered by the CAA on a case by case basis.

## 1.6.    Operations outside of the UK

The UK CAA's RAE approval is limited to organisations whose principal place of business is in the UK. However theoretical training and assessment can be carried out outside of the UK, including remote training and invigilation.

Any Practical Flight Assessment must be carried out in the UK.

# CHAPTER 2   |   The RAE Application Process

# 2. The RAE Application Process

## 2.1.   Eligibility

Any natural or legal person (organisation) shall be eligible to apply for an approval under these requirements.  Applicants must be at least 18 years of age and RAE approvals are limited to organisations whose primary place of business is in the UK.

## 2.2.   Applications

Initial applications for approval as an RAE are to be made in writing to uavenquiries@caa.co.uk  using Form SRG1322 . This application must contain all required documentation in support of the application as detailed in paragraph 2.3.

When applying, the applicant must undertake to pay the required charges. These charges are published on the CAA website as 'CAA Scheme of Charges (General Aviation)' www.caa.co.uk/ors5.  The assessment process will not begin until the necessary fees have been paid.  Where additional hours are required to assess an application, the applicant will be notified before any further charges are applied.

Amendments that result in a change to the status of the RAE approval will be subject to prior authorisation by the CAA, and an appropriate charge will be applied in accordance with the CAA Scheme of Charges.  Further details are at paragraph 5.4.

## 2.3.   Documentation

The organisation shall demonstrate, based on the information submitted in their documentation, that it has the capability to discharge its obligations.

The following points below are to be considered when preparing the required documentation:

General

- Facilities; including the facilities used for theoretical assessment and practical assessment, with minimum requirements for each;

- Equipment and tools;

- Processes and associated materials; i.e. Technical Procedures Manual and study material for students;

- Number and competence of staff; i.e. qualifications and experience for the role being performed.

The following documentation shall be submitted as part of an initial and renewal application for review by the CAA:

### 2.3.1.    Exposition

The exposition must contain the following information:

- A statement signed by the accountable manager confirming that the exposition and any associated manuals will always be complied with;

- Scope of RAE approval;

- An organogram/chart of the RAE showing associated chains of responsibility;

- Documents detailing nominated post holders within the organisation, this shall include:

    ○ Description of post holders' duties and responsibilities;

    ○ Description of the respective person's competence.

- Documents detailing personnel nominated to conduct training, theoretical examinations and practical skill assessments, plus any other relevant staff to include:

    ○ Minimum requirements for each role identified, i.e. instructors, theory assessors, practical flight assessor;

    ○ Descriptions of each person's experience and competency;

    ○ Personnel duties and responsibilities.

- A list of staff authorised to submit reports to the CAA;

- A detailed description of the facilities that will be used for theoretical knowledge training, examinations, and practical skill assessments.  This should include:

    ○ The minimum requirements for each facility;

    ○ The location of the approved facilities.

- The procedure for amendments to the RAE exposition and the notification of these changes to the CAA;

- The procedures for theoretical knowledge examinations assessments, including templates for any assessment reports. This should include reference to any remote invigilation procedures and the platform used;

- The procedures for practical skill assessments, including templates for any assessment reports;

- The levels of theoretical knowledge training that the RAE will provide to remote pilots;

- Arrangements for a formal, periodic internal safety review that shall be convened at least once in any three-month calendar period. These reviews should be conducted sooner should an immediate safety risk be identified that requires immediate action by the organisation.

### 2.3.2.    Technical Procedures Manual

The TPM outlines the processes and procedures for training and assessment. This can be presented as a separate document or as part of the exposition submission and must include details of:

- A2 Certificate of Competency course (*As outlined in Annex A)*:

    ○  Outline course detail;

    ○  Theory training and assessment process;

    ○  The procedures and criteria that the organisation shall apply to determine; whether a certificate should be issued to a remote pilot.

- General VLOS Certificate (*As outlined in Annex B)*:

    ○  Outline course detail;

    ○  Theory training and assessment process;

    ○  Operations manual writing and acceptance;

    ○  Practical flight assessment requirements and process, including a clear explanation and illustration of any specific manoeuvres that will be assessed;

    ○  The procedures and criteria that the organisation shall apply to determine whether a certificate should be issued to a remote pilot;

### 2.3.3.    Examination Papers and Answers

The process for examinations must be captured within the TPM.

The number of question papers must accommodate the resit process and ensure that a candidate does not sit the same paper twice.

Examination papers must include the proposed answers, and contain questions covering the requirements and syllabus outlined in Annexes A and B.

### 2.3.4.    Teaching Material/slides

All teaching slides must be drafted in accordance with the syllabus topics outlined in Annexes A and B.

### 2.3.5.    Student Handouts

Student handouts include items such as workbooks and subject matter to support the teaching material and reflect all current guidance and regulations.

Any handouts must be drafted with reference to the syllabus topics outlined in Annex A and B.

# CHAPTER 3 | The RAE Approval Process

# 3. The RAE Approval Process

## 3.1. Approval Requirements

An organisation shall be entitled to be approved as an RAE when it has demonstrated compliance with the applicable requirements, and after the successful completion of any audits and inspections that may be necessary.

## 3.2. CAA UAS Sector Team Assessment

RAE applications will be assessed by the UAS Sector Team in the following manner:

- The SRG1322 and the relevant documents (outlined in chapter 2.3) will be examined for completeness and accuracy ('desktop assessment');
- Once all documents have been assessed, initial feedback will be provided to the applicant via email. This feedback may also contain an oversight report that will provide any findings and/or observations with a request to address these;
- When any initial findings or observations have been addressed satisfactorily and the desktop audit has been completed, an on-site audit may be scheduled as follows:
    - Initial applications for RAE approval (i.e. the first assessment) will always be subject to an on-site audit;
    - Applications for renewals and/or variations to RAE approvals will be visited on a case-by-case basis at the discretion of the CAA based on performance-based oversight principles (see paragraph 4.2).
- Upon approval, an RAE will receive an Approval Certificate via email. Templates of the relevant certificates that should be issued to successful candidates will also be included;
- The applicant will be notified when an application is unsuccessful. Any subsequent application from the same organisation must be presented as a new application.

## 3.3. Terms of Approval

The terms of approval issued by the CAA will identify the scope of work for which the RAE is entitled to exercise; namely: theoretical knowledge delivery, theoretical knowledge assessment and practical skill assessment.

An RAE may only issue a certificate to a remote pilot, or submit a recommendation to the CAA, in the formats prescribed at A.4 and B.7.

Any changes to the terms of approval must be approved in advance by the CAA – see 2.6.

## 3.4.    Duration and Continued Validity

The period of validity of an RAE approval shall extend for one calendar year from the date the approval is granted, however the approval may be revoked if:

- The RAE fails to demonstrate compliance with applicable regulations, requirements or any changes to the requirements, criteria or assessment standards that may subsequently be published by the CAA; or

- The CAA is prevented from performing its duties by the organisation; or

- There is evidence that the organisation cannot maintain satisfactory control of the activities under its RAE approval; or

- The organisation no longer meets the eligibility requirements for an RAE approval; or

- The RAE has surrendered the approval.

An organisation may not function as an RAE when its approval has expired, irrespective of whether a renewal has been applied for.  The duration of validity is displayed on the approval certificate for tracking purposes.

An RAE may apply to renew its approval up to 90 days before the date of expiry without loss of validity.  Renewals for an approval as an RAE are to be submitted using Form SRG1322 to uavenquiries@caa.co.uk .

Upon surrender or revocation, the original RAE approval certificate must be returned to the CAA.

# CHAPTER 4   |   Oversight of RAEs by the CAA

# 4. Oversight of RAEs by the CAA

## 4.1.  General

The RAE shall allow the CAA to undertake any oversight activities that are necessary to determine compliance and continued compliance with these requirements.

The RAE shall allow the CAA to review any report, make any inspection and perform or witness any flight or ground examination that is necessary to check the validity of the RAE's compliance statements.

The CAA will carry out oversight of RAEs following performance-based oversight (PBO) principles. This will dictate the minimum level of oversight required, that is adjusted to increase, decrease, or vary oversight activity depending on the complexity, risk level and performance of an RAE.

## 4.2.  Audits

Desk top audits will be carried out as required. The RAE shall provide the CAA with any documentation and records required to carry out this activity.

On-site audits will be scheduled in conjunction with the RAE and the scope of the audit clearly detailed.  Audits will be conducted by the RPAS Sector Team and should be carried out at one of the primary assessment sites to accommodate an inspection of the facilities. On occasion audits may be carried out at different locations depending on the RAE's facilities.

Any findings or observations will be discussed during the audit and a timescale for their rectification will be agreed.

Oversight reports will be distributed to RAEs within 28 working days of completion of any on site activity. The RAE will be expected to respond within the allocated timescale detailing the actions intended to take to rectify any identified issues.
Further communication will continue as considered necessary by the CAA until the oversight report and associated findings/observations are closed.

The CAA reserves the right to conduct audits at 'no notice' if considered necessary.

## 4.3.    Findings and Observations

When evidence is found by the CAA during an audit or inspection that shows non-compliance with the applicable requirements, a finding will be raised and notified to the RAE approval holder.

Findings are classified as follows:

- A Level1 finding is any non-compliance with these requirements that could lead to an effect on the safety of a UAS operation;

- A Level-2 finding is any non-compliance with these requirements that is not classified as Level 1.

An Observation may be raised where there is potential for future non-compliance if no action is taken, or where the CAA wishes to indicate an opportunity for safety improvement or direct the RAE towards best practice.

## 4.4.    Subsequent Actions

On receipt of a notification of a finding or an observation, the following actions must be taken:

- In the case of a Level 1 finding, the holder of the RAE approval shall demonstrate corrective action to the satisfaction of the CAA within a period of no more than 21 working days after written confirmation of the finding;

- In the case of a Level 2 finding, the corrective action period granted by the CAA shall be appropriate to the nature of the finding but shall not normally be more than 3 months.  In certain circumstances and subject to the nature of the finding, the CAA may extend the 3 month period subject to a satisfactory corrective action plan;

- In the case of an observation, corrective action is not obligatory, but an RAE would be expected to provide a sound reasoning as to why the observation is not being followed.

## 4.5.    Suspensions, Revocations, and Special Status

In some cases, a level-one or level-two finding may result in a provisional, partial or full suspension of the RAE approval, or a revocation.

If notified of a suspension or revocation, the RAE approval holder shall provide the CAA with written confirmation of receipt of the notice of suspension or revocation within two

working days of receipt.

- A provisional suspension means that an RAE's approval is suspended pending further investigation;

- A partial suspension means that only part of the RAE's approval is suspended pending corrective action;

- A full suspension means that the entire RAE's approval is suspended pending corrective action.

A revocation means that an entity is no longer approved as an RAE and may no longer exercise the privileges of an RAE until a new application is made and an approval issued.

If the CAA deems it necessary to take this kind of action, the RAE will be placed **On Notice**.  A letter will be provided to the Accountable Manager explaining what this means. Placing an organisation On Notice is the mechanism by which the CAA will increase its level of oversight following an issue such as a significant finding.  It may be that an RAE is placed On Notice for other reasons outside of the audit cycle; if this is the case, the circumstances will be fully explained in the On Notice letter.

If an RAE undergoes a large degree of change or enters a period where it may require more oversight not related to poor performance, the organisation may be placed on **Special Attention**.  This is a means of formalising the CAA's intent to provide more oversight for a set period, for any reason other than performance.  A letter to the Accountable Manager will explain the intent and approach the CAA plans to take.  It is a mechanism to provide additional safety assurance to the organisation, and in no way reflects its ability.

# CHAPTER 5 | RAE Management and Staff

# 5. RAE Management and Staff

## 5.1. General

An accountable manager must be nominated by the organisation. The accountable manager is accountable to the CAA and responsible for:

- Ensuring all tasks are performed to the required standards;

- Ensuring the organisation is continuously in compliance with the information and procedures identified in the exposition.

Where a person or group of persons has been nominated to ensure the organisation complies with the requirements detailed in the exposition, they shall be identified, together with the extent of their respective responsibilities. Such person(s) shall act under the direct authority of the accountable manager. The persons nominated shall be able to show the appropriate knowledge, background and experience to discharge their responsibilities.

The RAE shall maintain a record of all personnel authorised to submit recommendations or issue certifications. The record shall include details of the scope of each person's individual authorisation.

## 5.2. Competence of RAE Staff

The staff responsible for any delivery of theoretical knowledge and assessment tasks must have the required knowledge, experience and competence. The assessment staff must be free of any pressure and incentive which could affect their judgment or the results of their assessments.

The RAE must demonstrate the capability to adequately perform the technical and administrative tasks linked with the assessment process, including the use of personnel, facilities and equipment appropriate to the task.

The staff responsible for any delivery of theoretical knowledge education or assessment tasks shall meet the following requirements:

- Sound technical and vocational training in a relevant subject area, demonstrated by any of the following means:

  ○ A practical background in aviation in the areas relevant for the theoretical knowledge training provided and have undergone a course of instructional technique training; or

- ○ Previous experience in delivering theoretical knowledge instruction and an appropriate theoretical background in the subject on which they will provide theoretical knowledge instruction.

- A sound knowledge of the requirements for the practical skill assessment tasks they carry out and adequate experience of such processes;

- The ability to administer the declarations, records and reports that demonstrate that the relevant assessments have been carried out and the conclusions of those assessments;

- The ability to interpret and assess operations manuals;

- Information that is supplied to RAEs by individuals applying for remote pilot certificates, or by UAS operators, must not be disclosed to any person other than the UK CAA.

## 5.3.    Impartiality of RAE Staff

Any documentation supplied with the RAE application must include a clear statement to confirm that there is a clear separation between the RAE's training or assessment activities and any other operational activity conducted by the organisation, such that the objectivity of the activities conducted under the RAE approval is not called into question.

## 5.4.    Changes to the Organisation

Any changes to an RAE's organisation must be referred to the CAA for approval using the application process set out in paragraph 2.2.

The following changes will be considered to be 'significant amendments' and shall be charged as a variation:

- Change in ownership;

- Changes in the scope of the approval.

- Change of Accountable Manager

The following changes will be will normally be considered as 'administrative changes'[2]:

- Addition of training and assessment sites;

- Personnel amendments (excluding Accountable Manager);

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[2] The complexity of the additional work may require this to be treated as a variation

- Administrative updates to exposition and supporting documents.

# Annex A | The 'A2 Certificate of Competency' (A2 CofC)

# Annex A – The 'A2 Certificate of Competency' (A2 CofC)

## A.1  General

The A2 CofC is a remote pilot competency certificate primarily intended to assure safe operations of unmanned aircraft close to uninvolved persons.  The certificate assures an appropriate knowledge of the technical and operational mitigations for ground risk (the risk of a person being struck by the unmanned aircraft).

An A2 CofC is required to be held by the remote pilot when:

Open category

- Operating in the A2 subcategory;

- Operating in the A1 subcategory under the 'A1 Transitional Provisions' as set out in Article 22 of the European Commission Implementing Regulation (EU) 2019/947.

Specific category

- Operating under the conditions of a published  PDRA where the A2 CofC is specifically listed as an acceptable level of remote pilot competency for that  PDRA.

In some circumstances, the A2 CofC may also be proposed within a UAS operator's operational risk assessment as being a sufficient level of remote pilot competency for the operation being proposed; however, the CAA will still hold the final determination on whether this is acceptable.

The A2 CofC is a theoretical examination only but is predicated on a 'building block' process of training and testing which is listed in the following paragraph.  There are no practical flight test requirements for the A2 CofC.

Prior to taking the examination, the remote pilot is required to have completed the following 'building blocks':

- Successful completion of the CAA's 'Drone and Model Aircraft' online training course for basic remote pilot competency and the associated competency test, and be in possession of the 'Flyer ID' number associated with that test;

- Completion of a period of practical flight training, either under the guidance of an RAE or under 'self-monitored' circumstances, conducted within the operating conditions of subcategory A3 but simulating the operating situations associated with the A2 subcategory.

- Remote pilots must declare, in writing, that they have completed the above building blocks to the RAE and they shall provide evidence, for the self-practical training, by means of a flight log, to the RAE.

## A.2    Theoretical Examination Process

The A2 CofC examination must be conducted under formal examination conditions at a facility provided by the RAE.

The examination comprises of a minimum of 30 multiple-choice questions which are aimed at assessing the remote pilot's knowledge of the technical and operational mitigations for ground risk and will specifically cover the following subjects:

- Meteorology;

- UAS flight performance;

- Technical and operational mitigations for ground risk.

The specific syllabus topics are listed in paragraph A.3 below.

The examination may be electronic or paper-based but must be of a closed book format (except when questions require reference to charts, or other sources of specific aeronautical information).  The minimum pass mark must be no less than 75%.

The examination is to be 75 minutes in duration (approximately 2½ minutes per question). Any candidate with a recognised disability or additional needs (e.g. dyslexia or dyspraxia) should be granted an extra 15 minutes to complete the examination.

If, following a failure of a previous attempt, an examination is being repeated, the student must sit a different set of questions to that used previously.

A record of each examination taken by a student, including those that were failed, must be retained by the RAE for a minimum of 5 years.

## A.3    Theoretical Examination Syllabus

The A2 CofC theoretical examination, as well as any associated theoretical knowledge training courses that are provided, must cover all subject areas in the table below.

Each area must be examined in enough depth to establish that students hold a suitable level of understanding of the topic so that they can determine the intent, the methods of compliance, and how this relates to their own intended operation.  Specific attention should be given to how problem/emergency scenarios are addressed.

| Subject | Areas to be Covered |
|---|---|
| Meteorology | **Introduction to obtaining and interpreting weather information**<br>- Weather reporting resources<br>- Reports, forecasts and meteorological conventions appropriate for typical UAS flight operations<br>- Local weather assessments<br>**Effects of weather on the unmanned aircraft**<br>- Wind – urban effects, gradients, masking, turbulence<br>- Temperature – precipitation, icing, turbulence<br>- Visibility factors<br>- Clouds – Cumulonimbus (CB) hazards (including lightning)<br>- IP43 (International Protection) IEC/EN 60529 standards with regard to water ingress |
| UAS Flight Performance | **Typical operational envelope of a rotorcraft, fixed wing and hybrid configurations**<br>- Basic principles of flight<br>**Operating guides**<br>- Flight procedures/basic drills<br>- Emergencies<br>**Maintenance of system**<br>- Scheduled and repairs<br>- Manufacturer's recommendations<br>- Assessment 'safe to be flown?'<br>**Mass and balance and centre of gravity (CG)**<br>- Consideration of the overall balance when attaching gimbals, payloads<br>- Understand meaning of MTOM<br>- Security of the payload<br>- Payload characteristics – how differences can affect the stability of a flight<br>- CG – differences between different types of UA<br>**Batteries**<br>- Understand the terminology used for batteries (e.g. memory effect, capacity, c-rate)<br>- Differences in battery types<br>- Understand how a battery functions (e.g. charging, usage, danger, storage)<br>- Battery safety - how to help prevent potential unsafe conditions |

| Subject | Areas to be Covered |
|---|---|
| UAS Operating Principles | **UAS operations** |
| | - Visual Line of Sight (VLOS) |
| | - Avoiding collisions – 'See and Avoid' |
| | - Decision process |
| | - Stress/pressure from 'customers' |
| | - Occurrence reporting and investigation |
| | **Congested area operations** |
| | - Planning and preparation |
| | - Hazard identification |
| | - Overflight of people |
| | - Public/third parties – crowds and gatherings |
| | **Medical fitness** |
| | - Crew health precautions |
| | - Alcohol, drugs, medication, medical restrictions |
| | **Fatigue** |
| | - Flight duration/flight workload |
| | - Outdoors and lone working |
| | **Technical and operational mitigations for ground risk** |
| | - Low speed mode function |
| | - Evaluating distance from people |
| | - 1:1 rule |

## A.4  Certificate Format

The A2 CofC must be provided to candidates in a format which will be specified by the CAA.

# Annex B  | The 'General VLOS Certificate' (GVC)

# Annex B – The 'General VLOS Certificate' (GVC)

## B.1    General

The GVC is a remote pilot competency certificate which provides a single qualification that is suitable for VLOS operations within the Specific category.  The GVC is acceptable for all VLOS operations conducted under a published PDRA and, in most circumstances, it will be considered an acceptable level of remote pilot competency within an operational risk assessment for any other VLOS operation.

The GVC is valid for a period of five years from the date that the examination was taken.

The GVC comprises both a theoretical examination and a practical flight test, conducted at an RAE facility.  It is predicated on a 'building block' process of training and testing which is listed in the paragraph below.  In certain cases, which will be specifically listed within CAP 722, some persons may be exempted from the requirement to undertake the practical test.  The theoretical flight test must, however, be undertaken by all applicants.

Prior to taking the GVC examination and flight test, the remote pilot is required to have completed the following 'building blocks':

- Completion of the CAA's 'Drone and Model Aircraft' online training course for basic remote pilot competency;

- Successful completion of the CAA's online competency test and be in possession of the 'Flyer ID' number associated with that test.

## B.2    Theoretical Examination Process

The GVC theoretical examination is to be conducted under formal examination conditions provided by the RAE and accepted by the CAA.

The examination must comprise a minimum of 40 questions that cover the full range of subjects listed in the table at B.3 below.  This composition must be accepted by the CAA. There must be a minimum of 5 questions in each of the following subject areas:

- Air law/responsibilities;

- UAS airspace operating principles;

- Airmanship and aviation safety.

The examination questions may be in the following formats:

- Multiple-choice questions – a choice of no less than 4 answers;

- Long answer questions;

- A mixture of both multiple-choice and long answer questions.

The examination may be electronic or paper-based but must be of a closed book format (except when questions require reference to charts, or other sources of specific aeronautical information).  If part of the examination is conducted by other means, e.g. a flight planning scenario, an oral discussion or a briefing, an adequate summary of the questions and responses must be recorded, including the identity of examiner.

The minimum overall pass mark must be no less than 75%.

The duration of the examination can be determined by the RAE and is subject to acceptance by the CAA.  Any candidate with a recognised disability or additional needs (e.g. dyslexia or dyspraxia) should be granted an extra 10% of the allocated assessment time to complete the examination.

If an examination is being repeated, the student must sit a different set of questions to that used previously.

A record of each examination must be retained by the RAE for a minimum of 5 years.

Remote invigilation is permitted provided the RAE provides the procedures and details of the host platform. Remote invigilation recordings must be retained for 5 years and provided to the CAA upon request

**Note:** *The GVC theoretical examination may also include the A2 CofC examination in one sitting, but the examination must be expanded to 60 questions.*

## B.3    Theoretical Examination Syllabus

The following subject areas below must be covered within the examination and any related face to face classroom or web-based instruction.

Each area must be examined in enough depth to establish that students hold a sufficient level of understanding of the topic so that they can determine the intent, the methods of compliance, and how this relates to their own intended operation.  Specific attention should be given to how problem/emergency scenarios are addressed.

| Subject | Areas to be covered |
|---|---|
| Air Law/Responsibilities | **Terminology** |
| | **The EU UAS Regulation Package** |

| Subject | Areas to be covered |
|---|---|
| | - UK Regulation (EU) 2019/947 and AMC/GM |
| | - Overall principles |
| | - UAS operating categories |
| | - Specific requirements |
| | **Air Navigation Order** |
| | - Residual articles and definitions - Article 241 |
| | **General overview** |
| | - Responsibilities – UAS operator, remote pilot |
| | - Avoidance of collisions ('See and Avoid', i.e. Visual Line of Sight principles) |
| | **CAP 722** |
| | - Policy overview |
| | - Incident and accident reporting and investigation: MOR & ECCAIRS2 Portal, AAIB notification |
| | - Airprox reporting |
| | - Investigation handling/assistance |
| | - Insurance – aircraft and third-party liability (EU785/ 2004 compliance) |
| UAS Airspace Operating Principles | **Airspace overview** |
| | - Flight Information Region (FIR) |
| | **Airspace classifications** |
| | - Differing considerations, controlled airspace |
| | **Specific airspace types** |
| | - Flight Restriction Zone (FRZ), Aerodrome Traffic Zone (ATZ), gliding/parachuting/microlight sites etc |
| | **Airspace reservations** |
| | - Danger Areas, Prohibited Areas, Restricted Areas |
| | - Temporary Airspace Reservations |
| | **Obtaining information/approvals** |
| | - UK Aeronautical Information Publication (AIP) |
| | - Aeronautical Information Circulars (AICs) |
| | - Notices to Airmen (NOTAMs) |
| | - Permission and ENSF process |
| | - Whom to contact |
| | **UAS Operations** |
| | - Visual Line of Sight (VLOS) |

| Subject | Areas to be covered |
|---|---|
|  | - Segregated Airspace |
| Airmanship and Aviation Safety | **Good airmanship principles**<br>- Aircraft safe to operate<br>- Remote pilot fit to operate aircraft<br>- Proper planning and preparation<br>- Hazard identification<br>**Flight Safety**<br>- Avoiding collisions<br>- 'See and Avoid' with respect to manned aircraft and other air users<br>**Perception**<br>- Distance, height and speed awareness<br>- Planning, go/no go decisions<br>- Overflight of people, crowds and gatherings<br>- Congested area operations<br>- Flights at night<br>**Operational mitigations**<br>- For ground and air risks<br>**Remote pilot logbooks** |
| Human Performance Limitations | **Medical fitness**<br>- Crew health precautions<br>- Alcohol, drugs, medication<br>- Medical restrictions<br>**Fatigue**<br>- Flight duration/flight workload<br>- Time of flight<br>- Working hours<br>- Effects of weather<br>- Outdoor, remote and lone working<br>- Crew/colleague management<br>- Depth perception<br>- Blind spot<br>- Scan technique<br>- Decision process<br>- Public/third parties |

| Subject | Areas to be covered |
|---|---|
| | - Stress/pressure from 'customers' |
| Meteorology | **Introduction to obtaining and interpreting weather information**<br>- Weather reporting resources<br>- Reports, forecasts and meteorological conventions appropriate for typical UAS flight operations<br>- Local weather assessments<br>**Effects of weather on the unmanned aircraft**<br>- Wind – urban effects, gradients, masking, turbulence<br>- Temperature – precipitation, icing, turbulence<br>- Visibility factors<br>- Clouds – Cumulonimbus (CB) hazards (including lightning) |
| Navigation/Charts | **Basic map reading (OS)** – 1:50,000 and 1: 25,000<br>**Aviation charts** – 1:500,000 and 1: 250,000<br>- Interpretation<br>- Specialised charts (e.g. London helicopter routes)<br>- Understanding of basic terms:<br>  - Aeronautical units of measurement (Ft, km, Nm)<br>  - Elevation<br>  - Altitude<br>**GPS principles** |

| Subject | Areas to be covered |
|---|---|
| | - How it works and limitations |
| UAS General Knowledge | **Basic principles of flight**<br>-Fixed-wing, rotary wing and multi-rotor<br>**Command and Control**<br>- Datalink frequencies/spectrum<br>- Manual intervention/override<br>- Flight control modes<br>**Limitations**<br>- Operational envelope<br>- Stability<br>- Mass and MTOM<br>- Centre of gravity<br>- Effect of payload on flight<br>**Operating guides**<br>- Flight procedures/basic drills<br>- Emergencies<br>**Maintenance of system**<br>- Scheduled maintenance and repairs<br>- Security of aircraft/attached items<br>- Manufacturer's recommendations<br>- Assessment - 'safe to be flown?'<br>**Technical mitigations**<br>- For ground and air risks |
| Operator Responsibilities | **Development of operational procedures**<br>- Development of operations manual |
| Operating Procedures | **Pre-planning**<br>- Consideration of intended task<br>**Site assessment**<br>- Establishing a safe operating environment<br>- Hazard identification & risk assessment<br>- Mitigating measures<br>- Site owner's permission<br><br>**Situational awareness**<br>- Location |

| Subject | Areas to be covered |
|---|---|
| | - Airspace |
| | - Aerodromes |
| | - Obstructions |
| | - Public right of way |
| | **Communications** |
| | - Operating alone |
| | - Liaison with Air Traffic Control |
| | - Operating with other air users |
| | **Pre-flight** |
| | - Pre-flight checklist |
| | - Security of attachments/payload |
| | - Airworthiness |
| | - Failsafe check |
| | - Battery condition |
| | - Weather |
| | **In Flight** |
| | - In-flight monitoring |
| | - Fuel/battery status |
| | - Visual Line of Sight |
| | - Emergency actions: (Emergency Response Plan), loss of control/flyaway, malfunctions |
| | - Deconfliction/separation |
| | - Designated landing area not clear |
| | **Post-flight** |
| | - Post-flight actions - debrief/logging of flight details |
| | - Post-flight maintenance |
| | **Security** |
| | - Public access to aircraft and control |
| | - Other security considerations |

## B.4    Practical Flying Test

The GVC practical flying test is designed to provide assurance that the remote pilot being examined can safely undertake a wide range of VLOS operations within the Specific category, including those conducted under a published PDRA, whilst adhering to a set of procedures contained within an operations manual.  The test should be based on the

subjects within the GVC theoretical syllabus but must specifically include the points covered within the practical flight syllabus table at B.5 below.

The practical flight test must be conducted and assessed against an operations manual provided by the examinee (either self-developed or his/her employer's).

The RAE staff responsible for the assessment tasks must have adequate knowledge and competence of the operations of the type of unmanned aircraft that is to be flown during the test. The person responsible for conducting the practical flight assessment may also offer suitable training to the student prior to conducting the assessment.

The practical flying test must be conducted outdoors and at a location that is suitable for conducting the test (i.e. of suitable dimensions, volume and airspace class).

The RAE must include practical demonstrations of manoeuvres, relevant to the candidate's operations manual, that display the remote pilot's ability to safely position and control the aircraft.  Manoeuvres may be demonstrated individually, or as part of a more generalised operating scenario; they must be clearly described and illustrated within the RAE's application documentation and will be subject to assessment for suitability during the approval process.

The RAE must define the pass/fail criteria for the practical flight test assessment.  As a general guide, the criteria should consist of a combination of:

- 'Minor' errors – cumulative up to a maximum of 7, at which point the test is failed;

- 'Major' errors – cumulative up to a maximum of 3, at which point the test is failed;

- 'Safety' errors – any single safety error will result in an automatic failure.

The practical test must be summarised in a written report that details the test scenario that was used, the manoeuvres undertaken and an assessment of the examinee's performance for each 'section' of the test, along with guidance on areas for improvement where applicable.  Reports must also contain details of the examinee, the assessor, any additional personnel involved and the date and location of the test.

A record of each practical assessment must be retained by the RAE for a minimum of 5 years.

**Note:** *if a candidate is using a hybrid aircraft, the primary system of generation of lift should be considered for the competency. For example, if the aircraft gets its lift primarily from fixed wing, the certificate should be fixed wing.*

## B.5    Practical Flying Test Syllabus/Assessment Criteria

RAEs are to ensure that their students can satisfactorily demonstrate at least the following

skills during the practical flight assessment.

| Subject | Areas to be covered |
|---|---|
| **Pre-Flight Actions** | **Mission planning (to include meteorological checks), airspace considerations, and site risk-assessment**<br><br>- Identify the objectives of the intended operation<br><br>- Ensure that the defined operational volume and relevant buffers (e.g. ground risk buffer) are suitable for the intended operation<br><br>- Identify any obstacles in the operational volume that could hinder the intended operation<br><br>- Consider whether the air flow may be affected by topography or by obstacles in the operational volume<br><br>- Consider any external factors that may affect the flight, and assess their impact on the operation<br><br>- Review the relevant airspace information (including on UAS geographical zones) that can have an impact on the intended operation<br><br>- Confirm that the UAS is suitable for the intended operation<br><br>- Ensure that the selected payload is compatible with the UAS being used for the operation<br><br>- Determine the measures necessary to comply with the limitations and conditions applicable to the operational volume and ground risk buffer for the intended operation in accordance with the operations manual procedures for the relevant scenario<br><br>- Identify and, where necessary, implement the procedures to operate in Flight Restriction Zones or controlled airspace, including a protocol to communicate with ATC and obtain clearance and instructions<br><br>- Confirm that all the necessary documents for the intended operation are on site<br><br>- Ensure all participants are sufficiently briefed on the details of the planned operation<br><br>**Aircraft pre-flight inspection and set-up (including flight controller modes and power-source hazards)**<br><br>- Assess the general condition of the UAS in accordance with the procedures contained within the ex and manufacturer's instructions |

| Subject | Areas to be covered |
|---------|---------------------|
|  | - Ensure the set-up procedures are completed correctly in accordance with the manufacturer's instructions |
|  | - Ensure that all the removable components of the UAS are properly secured |
|  | - Make sure that the UAS software configurations are compatible/up to date |
|  | - Check that the UAS instruments are calibrated appropriately, as required by the intended operation |
|  | - Identify any fault, damage or configuration that may compromise the intended operation |
|  | - Ensure the propulsion energy level (e.g. battery life, or other fuel supply) is sufficient for the intended operation |
|  | - Confirm that the flight termination system of the UAS and its triggering system are compliant |
|  | - Check the correct functioning of the command and control link |
|  | - Activate the geo-awareness system and upload the information to it (if geo-awareness system is available) |
|  | - Set the height, speed and distance limitation systems (if available) |
|  | - Set the direct remote identification system (if fitted) |
|  | **'Pre-take-off verbal briefing' given by the examinee stating the basic actions to be taken in the event of an aircraft emergency or if a mid-air collision hazard arises during the flight** |
| **In Flight Procedures** | - Maintain an effective look-out and keep the aircraft within Visual Line of Sight (VLOS) at all times |
|  | - Maintain situational awareness, particularly with respect to: |
|  | - Location of the aircraft in relation to other airspace users |
|  | - Meteorological conditions |
|  | - Obstacles, terrain and uninvolved persons |
|  | - Perform accurate and controlled flight manoeuvres at representative heights and distances (including flight in manual/non-GNSS assisted mode or equivalent where fitted) |
|  | - Take-off |
|  | - Perform after take-off/functionality checks |
|  | - Hover in position (Multirotor/ Helicopter/VTOL FW only) |

| Subject | Areas to be covered |
|---|---|
| | - Transition from hover into forward flight (Multirotor/ Helicopter/VTOL FW) |
| | - Climb and descent to/from level flight |
| | - Turns in level flight |
| | - Speed control in level flight |
| | - Transition from forward flight into hover (Multirotor/ Helicopter/VTOL FW) |
| | - Precision manoeuvring in hover (Multirotor/ Helicopter/VTOL FW) |
| | - Approach and landing |
| | - Actions following failure of a motor/ propulsion system (according to aircraft type) |
| | - Evasive action (manoeuvres) to avoid collisions |
| | - Real-time monitoring of aircraft status and endurance limitations |
| | **Flight under abnormal conditions** |
| | - Display continuous awareness of, and consideration for, the safety of third parties on the ground |
| | - Deal correctly with a partial or complete loss of power to the unmanned aircraft system while ensuring the safety of any third parties |
| | - Manage the unmanned aircraft's flight path in abnormal situations |
| | - Manage a situation when the unmanned aircraft system positioning equipment is impaired |
| | - Manage a situation where an uninvolved person enters the zone of operation and take appropriate measures to maintain safety |
| | - React to, and take the appropriate corrective action for, a situation where the unmanned aircraft is likely to exceed the limits of the intended operating area |
| | - Take the appropriate action for a situation when another aircraft approaches the operating area and is in confliction with the unmanned aircraft |
| | - Demonstrate the recovery method following a deliberate (simulated) loss of the C2 Link. In place of any rotary wing 'return to home' function, fixed-wing aircraft may demonstrate an equivalent procedure that results in a suitably automated, low-impact descent and landing. When demonstrating this function, the student must also demonstrate how collisions will be avoided |

| Subject | Areas to be covered |
|---|---|
| **Post-flight Actions** | - Shut down and secure/make safe the UAS<br><br>- Post-flight inspection and recording of any relevant data relating to the general condition of the UAS (its systems, components and power-sources), controller functionality and crew fatigue<br><br>- Conduct a debriefing of the operation with all relevant personnel<br><br>- Identify situations where an occurrence report may be necessary and complete the required occurrence report |

## B.6   Certificate Format

The GVC must be provided to candidates in a format which will be specified by the CAA.