

European Unmanned Systems Centre



Light UAS Scheme™

BNUC-S™

Basic National UAS Certificate – Small Unmanned Aircraft

CANDIDATE GUIDE

Light UAS Operations (MTOM < 20kg)

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SECTION 1 - INTRODUCTION

1.1 BNUC-S™ - MTOM <20kg

The BNUC-S™ provides the UAS Qualification for Small Unmanned Aircraft (SUA) and Small Unmanned Surveillance Aircraft (SUSA) with MTOMs of less than 20Kg that are used for “Aerial Work” and takes into account the commercial operating environment that is expected for SUA and SUSA Operators.

The full Pilot/Crew BNUC-S™ qualification consists of two parts:

- PART 1 Ground School Examination (see Section 2) – 85% pass mark required
- PART 2 Flight Test Examination (see Section 3)

An independent design and construction assessment is not explicitly required by the CAA for the aircraft, who only require that the Operator ensure themselves of the ‘airworthy condition’ of their aircraft. The emphasis below 20Kg is on the responsibility of the Operator for flight planning and preparation, assessing the airworthiness of the aircraft, assessing the site and ensuring the safety of the flight operation in respect of other air users, people on the ground, building and structures.

Therefore Operators need only seek a BNUC-S™ if their aircraft has a MTOM below 20Kg in order to gain the necessary permission to operate.

However the Operator may wish to have an independent assessment of the site, the airworthiness of the aircraft and other factors in order to gain the necessary assurances that may be required from insurance or other company operational perspectives.

Additionally, since the BNUC-S™ is a qualification specific to a UAS type the candidate needs to provide the make, model and modification state of the UAS. Gaining a design and construction certificate makes this explicit and avoids any confusion. See www.eurousc.com for more details.

1.2 LUASS™ for Pilots/Crew

From a Pilot/Crew perspective, the BNUC™ or BNUC-S™ certificate provides an independent assessment that a Pilot or Crew member has demonstrated the required competency to operate a specific Light UAS. The reason that the qualification must be specific is that there are a variety of Light UAS with extensive differences in design and operation. Also the operation of a 2kg UAS and even an 18kg UAS can be markedly different, with different ground control facilities and modes of operation.

1.3 National Standards

The National Standards embodied in the BNUC™ Scheme are agreed with the UK Civil Aviation Authority.

The qualification is accepted by the CAA as recognition of competency and is cited on Permissions for Aerial Work and Exemptions issued by the CAA.

1.4 Examination Fees

Fees are charged for the Examination of candidates and the assessment of specific Light UAS training requirements and implementations.

1.5 Penalties and Re-Tests

Candidates may sit the Ground School Examination any number of times until passed. A fee is required for each exam. No charge is made for a flight re-test on the same day but a re-test on a different day will incur a new flight test fee to be paid.

1.6 Acceptable Means of Compliance (AMC)

At present there is no qualification which is accepted as equivalent to either the BNUC™ or BNUC-S™.

1.7 Display/Demonstration Flying

Those undertaking Displays or Demonstration Flying of Light UAS that involve the public, must write specifically to EuroUSC™ Administration (admin@eurousc.com), allowing at least 45 days notice. EuroUSC™ will assign an Examiner to confirm the chosen Pilots competency or carry out a flight test examination as deemed appropriate by the Examiner. Normal examination fees apply.

For large events a consolidated request can be made. The Chief Examiner reserves the right to carry out specific examinations of Pilot competency prior to the event.

In all cases, any Examiner will expect to see evidence that the event has been properly organised and that necessary insurance cover is in place.

1.8 Candidate Identification

All candidates must present an acceptable form of photographic identity such as a Driving License or Passport.

1.9 Age and Medical Condition

Pilots must be at least 18 years of age, and persons deemed to be the legal Operator are required to be at least 18 years of age.

Candidates must ensure that they are medically fit to operate the relevant aircraft and may wish to undertake an NPPL Medical declaration.

1.10 Log Book and BNUC-S™ Register

Pilots are required to keep a log of all flights that they have undertaken. EuroUSC™ maintains a register of all BNUC-S™ certificates.

1.11 BNUC-S™ Currency

The Pilot of a SUA/SUSA should maintain a logbook of all flights as evidence of currency. This may include a combination of actual and simulator flying. A Pilot who has not flown for 6 months must present himself for a re-examination before they are allowed to operate a SUA/SUSA. Loss of 'flying skills' and loss of system understanding can occur rapidly and therefore Pilots are encouraged to practice their operating skills on a regular basis and undertake refresher courses.

Practice in operating and flying skills may optionally be carried out at any Flying School approved for the purpose by EuroUSC™. Logbooks signed by an approved Flying School will be sufficient evidence to satisfy requirements of currency.

1.12 Renewals

An annual renewal of the BNUC-S™ is required by the CAA. Candidates renewing their BNUC-S™ need only supply EuroUSC™ with their current logbook(s) covering the last 12 months of operation. EuroUSC™ may require a Flight Test Examination to be undertaken if it is deemed that either the currency or other factors have not been complied with.

1.13 Operations Manual, New Pilots and New Aircraft

The BNUC-S™ is type specific and the Flight Test Examination is dependent on an assessment of the Pilot against the supplied Operations Manual. If there are any significant changes to the Operations Manual then a copy of the Operations manual should be provided to EuroUSC™.

Significant changes are considered to be major changes to the company structure, operational procedures or accountable operating personnel plus any changes in aircraft types, additional new aircraft types or new operational Pilots.

If the company is covered by the Operators Programme then relevant documents will already be uploaded to your company's client website. EuroUSC™ will advise if any further actions are required such as a Flight Test Examination for specified personnel.

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SECTION 2 – GROUND SCHOOL EXAMINATION

2.1 Ground School Overview

The aim of the BNUC-S™ is to train potential UAS Pilots to the level required to operate a light UAS in the environments that they are most likely to encounter. In the first instance the 500m/400' bubble will prevail but also provision is made for some understanding of operations in segregated airspace (e.g. RA(T)) and the issues that will be encountered.

Additionally the type of application that will be undertaken by the Pilot and the type of air vehicle are of importance, as is the effects on operations when working closely with/to people, buildings and infrastructure (e.g. pipelines, power lines etc.)

The CAA emphasises the requirement for Pilots and Operating Companies to fully understand the regulatory environment and the rules that they must operate within. To this end the relevant parts of the following documents are required reading and a working knowledge of these will form part of the examination:

CAP 382 Mandatory Occurrence Reporting

CAA Ref: <http://www.caa.co.uk/CAP382>

CAP 393 – Air Navigation Order: The Order and Regulations: Amendment 2009

Articles 120, 131, 137, 138, 139, 149, 161, 163, 164, 165 166, 167, 223, 224, 225, 228, 232, (except 232(2)(a)), 243, 255 and 259.

CAA Ref: <http://www.caa.co.uk/CAP393>

CAP 403 - Flying Displays and Special Events: A Guide to Safety and Administrative Arrangements

CAA Ref: <http://www.caa.co.uk/CAP403>

CAP 722 Unmanned Aircraft Systems Operations in UK Airspaces – Guidance

CAA Ref: <http://www.caa.co.uk/CAP722>

It is helpful if candidates have a working knowledge of the Operations Manual submitted to EuroUSC™ as part of the Flight Test examination as this should contain practical advice relevant to UAS operations.

The examination is a multiple choice examination in which the candidate will be asked to answer both general and specific questions related to the regulatory environment, UAS operations and non-specific light UAS aircraft issues.

The list below shows the main topics that make up the Ground School Course.

- Air law
- Aircraft general knowledge planning
- Flight performance and operational planning
- Human factors, performance and limitations
- Meteorology
- Navigation and Map Interpretation
- Operational procedures
- Communications

Appendix A – Shows the current elements that are addressed by the Ground School course where questions may be asked in the Ground School Examination.

Note: The level and degree that each subject is dealt with is commensurate with the types of operation applicable mainly to the Visual Line of Sight scenario. Candidates wishing to operate Beyond Line of Sight (BLOS) need to undertake an additional module that deals with all aspects of BLOS Operation.

SECTION 3 – FLIGHT TEST EXAMINATION

3.1 Overview

The examination for a BNUC-S™ may be taken on application to a Registered Examiner. The examination will be carried out by a BNUC-S™ Scheme appointed Examiner:

If your organisation does not have an appointed EuroUSC™ Registered Examiner, you should contact the EuroUSC™ Chief Examiner who will arrange for one to be appointed

The ground school examination must have been completed prior to any flight test. The ground school exam covers the relevant parts of the Air Navigation Order, CAP 722 and the specific operations manual for the Light UAS being used for the test.

Due to the wide variety of aircraft types, the following Flight Test Examination for Fixed and Rotary wing aircraft is generic. The Examiner will vary the programme to suit the type of aircraft being used.

3.2 BNUC-S™ – MTOM <20kg (FIXED-WING)

The candidate must be able to demonstrate the capability to carry out the following.

PLANNING

Ensure that the chosen site is suitable for the type of operation to be carried out and that the necessary permissions and information are obtained e.g.

- Air Traffic control clearances
- local NOTAMs
- Weather forecast
- Local authority permission (bye-laws)
- Landowner permission

PRE-FLIGHT PREPARATION AND CHECKS

Ensure that suitable normal and emergency equipment is to hand suitable for the type of operation.

This may include.

- Windsock
- Wind/Temperature measurement equipment
- Fire extinguisher
- Radio for any ATC communications as applicable (must hold an R/T license)
- Inter-Crew communication radios (must hold relevant Ofcom license if applicable)

Carry out pre-flight checks as required by the Operations Manual and demonstrate that the aircraft systems are in an 'airworthy condition'

FLIGHT TEST

The following applies to conventional fixed wing operation. This will be modified to take account of specific aircraft features in line with the Operations Manual provided by the candidate prior to the Flight Test. Items (a) to (e) are used by the Examiner to determine basic skill level of the candidate if necessary. The main focus of the Flight Test is to assess the operational competence of the candidate in a simulated commercial environment.

(a) Take-off and complete a left (or right) hand circuit and overfly the take-off area.

(b) Fly a 'figure of eight' course with the crossover point in front of the Pilot, height to be constant.

(c) Fly a rectangular landing approach and overshoot from below 10 ft. Note that this manoeuvre is an aborted landing, not a low pass.

(d) Fly a rectangular circuit in the opposite direction to that in (f) at a constant height as previously agreed with the candidate.

(e) Fly a rectangular landing approach and land (wheels to touch within a pre-designated 30 metre boundary).

The Examiner will request a sequence of operations to be undertaken that will entail operating the aircraft accurately, appropriate to the type of aircraft being used. This may replace or be in addition to those expressed in (a) to (e); any changes or additions will be discussed with the candidate before each appropriate flight. In all cases, the specific type of UAS and the relevant sections in the Operations Manual will be taken into account.

POST FLIGHT CHECKS

- (a) Complete post-flight checks as required by the operations manual
- (b) Complete Pilot Log
- (c) Complete Post Flight Maintenance as appropriate

EMERGENCY HANDLING

During the flight the Examiner will initiate a “loss of communications” and/or a “loss of power” simulated event and expect the candidate to carry out any procedures as defined in the Operations Manual.

OTHER CONSIDERATIONS

At any pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either refuelling or the fitting of freshly charged flight batteries. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiners.

Two attempts per examination will be allowed in any one day.

All manoeuvres of the aircraft must be carried out in front of the Pilot and observable by the Ground Control Station (GCS) Operator and any payload Operator as applicable.

Depending on the wind direction, (c), (d) and (e) will be flown as EITHER left hand overshoot circuit, right hand rectangular circuit, left hand landing circuit OR right hand overshoot circuit, left hand rectangular circuit, right hand landing circuit.

Note: Flying commercially is different to flying for recreation. Depending on aircraft type and endurance, the Examiner may ask that a circuit (d) should be maintained for a pre-determined number of times up to a maximum of 5 minutes to ensure that the candidate is capable of sustained flight.

3.3 BNUC-S™ – MTOM <20kg (Rotary Wing – any configuration)

The candidate must be able to demonstrate the capability to carry out the following.

PLANNING

Ensure that the chosen site is suitable for the type of operation to be carried out and that the necessary permissions and information are obtained e.g.

- Air Traffic control clearances
- Local NOTAMs
- Weather forecast
- Local authority permission (bye-laws)
- Landowner permission

PRE-FLIGHT PREPARATION AND CHECKS

Ensure that suitable normal and emergency equipment is to hand suitable for the type of operation.

This may include.

- Windsock

- Wind/Temperature measurement equipment
- Fire extinguisher
- Radio for ATC communications (must hold an R/T license)
- Inter-Crew communication radios (must hold relevant Ofcom license if applicable)

FLIGHT TEST

The following applies to conventional fixed wing operation. This will be modified to take account of specific aircraft features in line with the Operations Manual provided by the candidate prior to the Flight Test. Items (a) to (e) are used by the Examiner to determine basic skill level of the candidate if necessary. The main focus of the Flight Test is to assess the operational competence of the candidate in a simulated commercial environment.

- (a) Carry out pre-flight checks as required by the Operations Manual.
- (b) Perform one 4-point pirouette with landings
- (c) Take off and climb to a safe altitude.
- (d) Fly a left hand rectangular circuit.
- (e) Fly a right hand rectangular circuit.
- (f) Fly a 'figure of eight' course with the crossover point in front of the Pilot, height to be constant (note that this is not a hovering manoeuvre).
- (g) Conventional helicopter's only
 - Perform one twenty second nose-in hover.
 - Perform an approach at 45° to the vertical, landing within a predetermined two metre square.

The Examiner will request a sequence of operations to be undertaken that will entail operating the aircraft accurately, appropriate to the type of aircraft being used. This may replace or be in addition to those in (a) to (g); any changes or additions will be discussed with the candidate before each appropriate flight. In all cases, the specific type of UAS and the relevant sections in the Operations Manual will be taken into account.

POST FLIGHT CHECKS

- (a) Complete post-flight checks as required by the operations manual
- (b) Complete Pilot Log
- (c) Complete Post Flight Maintenance as appropriate

EMERGENCY HANDLING

During the flight the Examiner will initiate a "loss of communications" and/or a "loss of power" simulated event and expect the candidate to carry out any procedures as defined in the Operations Manual.

OTHER CONSIDERATIONS

At any pre-determined point in the flight an intermediate landing may be permitted for the sole purpose of either refuelling or the fitting of freshly charged flight batteries. The pre-determined point may be either after a specific manoeuvre or at a specific time of flight, whichever is requested by the candidate and agreed by the Examiners.

Two attempts per examination will be allowed in any one day.

All manoeuvres of the aircraft must be carried out in front of the Pilot and observable by the Ground Control Station (GCS) Operator and any payload Operator as applicable.

Note: Flying commercially is different to flying for recreation. Depending on aircraft type and endurance, the Examiner may ask that a circuit (f) or (h) above, should be maintained for a pre-determined number of times up to a maximum of 5 minutes to ensure that the candidate is capable of sustained flight.

APPENDIX A - GROUND SCHOOL SYLLABUS

<p>1. Air Law</p>	<p>UAS Principles CAP 393 : Air Navigation Order and Rules of The Air CAP 722 : Guidance for UAS Operations in the UK CAP 403 : Flying Displays Organisational responsibilities Flight Operation Responsibilities Permissions, Exemptions and Aerial Work Documentation requirements Accidents, incidents and investigation handling Terms and terminology</p>
<p>2. Aircraft general knowledge</p>	<p>Airworthiness and operational envelope Effect of controls The “cockpit” panel and instruments Command and Control Manual intervention/override Operations Manual Maintenance Manual</p>
<p>3. Flight performance and operational planning</p>	<p>Establishing a safe operating environment Phases of Flight Flight Performance Limitations Speed, height etc. measurement and accuracy Site security Emergency procedures and incident handling Investigation procedures</p>
<p>4. Human factors, performance and limitations</p>	<p>Good Airmanship Medical fitness Ground Crew Management Air Crew Management Flight duration and workload Weather and human performance</p>
<p>5. Meteorology</p>	<p>Obtaining and interpreting weather information Operational envelope Operation at higher levels</p>
<p>6. Navigation and Map Interpretation</p>	<p>Limitations of GPS systems Stabilised flight, Pre-programmed and guided flight Map reading</p>
<p>7. Operational procedures</p>	<p>Safety “See and avoid” Principle Separation means safety Situational awareness UAS training</p>
<p>8. Communications</p>	<p>Operating alone Operating with Air Traffic Control Operating with other air users</p>