



Newmarket Model Flying Club

Helicopter and Multi-rotor Assessment

This document is provided for candidates wishing to undergo an NMFC Helicopter and Multi-rotor Assessment – a prerequisite for non-certified pilots wishing to fly rotary wing models solo or unaided.

To complete the assessment successfully, the candidate must first satisfy the Assessor that he or she has a good understanding of the capabilities (and limitations) of the model they intend to use (see Section 1 below).

If the Assessor is satisfied that the candidate has a sufficient understanding to fly the model safely, he will ask the candidate to complete the flying assessment described in Section 2 and to answer a subset of the questions on flight safety, operation and law listed in Section 3.

A maximum of two attempts at the assessment may be made on any one day.

Section 1: Model Capabilities

- | | |
|--------------------------------|--|
| Flight modes: | Candidates should be able to explain all their model's flight modes and how the model will behave in each mode. |
| Arming sequence: | Candidates must be able to explain the pre-flight arming sequence. Most models have a set stick/switch position to start or stop motors. |
| Failsafe settings: | Candidates should be able to explain what will happen on loss of signal, i.e., standard motors to idle or slow decent or return to home. This can also be linked to switches. |
| Switches: | Candidates should be able to clearly explain what flight modes are assigned to each switch. |
| Specific model considerations: | Candidates should be aware of specific behaviours relevant to their model. I.e. a motor failure on a bicopter, tricopter or quad will result in a crash, however on a hexacopter or octocopter the model will typically begin to pirouette, but still fly. |

Section 2: Flying Assessment

1. Carry out pre-flight checks as required by the BMFA Safety Codes, the CAA Drone Code and S.M.A.R.T / S.W.E.E.T.S – see page 4.
2. Take off and hover over the take-off point, with the model at approximately 10 feet, for about twenty seconds and then land.
3.
 - a. Take off and hover for about five seconds, then hover the model slowly forwards for approximately five metres, stop, and hover over the ground marker for about five seconds.
 - b. Hover the model slowly sideways, left or right, for approximately five metres, stop, and hover over the ground marker for about five seconds.
 - c. Hover the model slowly sideways in the opposite direction for approximately ten metres (five metres past its original position in front of the pilot), stop, and hover over the ground marker for about five seconds.
 - d. Hover the model slowly sideways in the first direction to bring it back to its original position in front of the pilot, stop, and hover over the ground marker for about five seconds.
 - e. Fly slowly backwards, bringing the model back to its original position over the take off point, stop, hover over the ground marker for about five seconds and land.

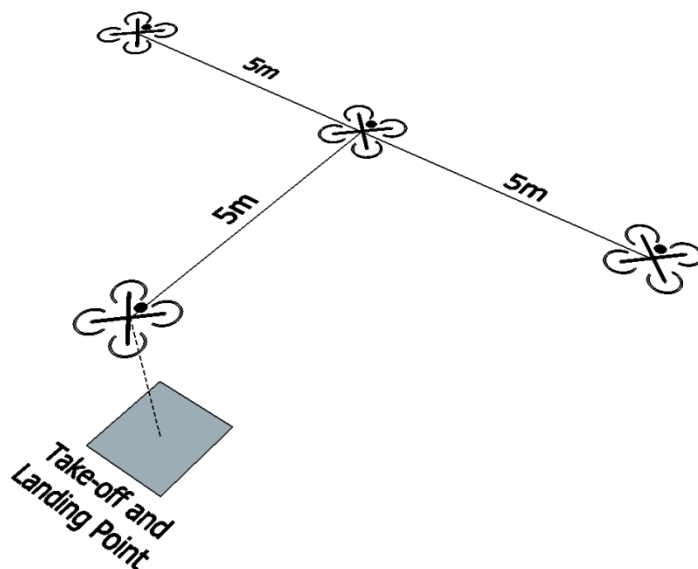


Figure 1 – Assessment step 3

4.
 - a. Take off and fly slowly forward for approximately 5 metres, stop and hover over the ground marker for about five seconds.
 - b. Turn 90 degrees either left or right and fly forward to perform two 'lazy eights', each at least 30 metres in length. Each time the model passes in front of the pilot it must be sideways on to the pilot and throughout the manoeuvre the model must be flying forward, not sideways.
 - c. At the conclusion of the two 'lazy eights', bring the model to a halt sideways-on over the centre marker. Turn the model until the rear of the model is facing the pilot and hover for about five seconds. From this point fly the model to a landing on the original take off point.

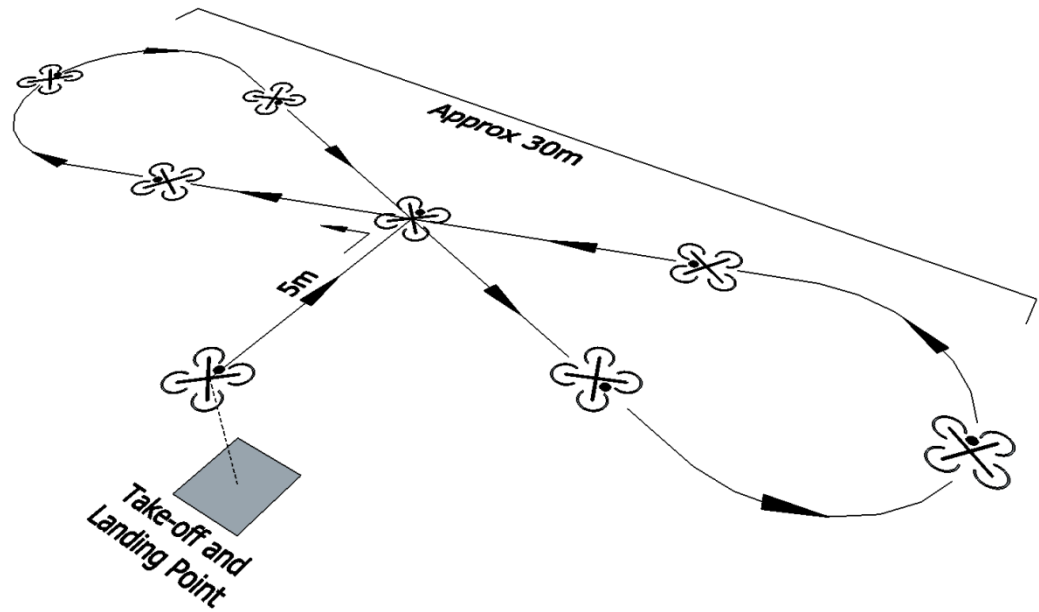


Figure 2 – Assessment step 4

5.
 - a. Take off and climb to a safe altitude.
 - b. Fly a left hand rectangular circuit. The model must change orientation on each leg of the circuit and be sideways on each time it passes the pilot.
 - c. Fly a right hand rectangular circuit.. The model must change orientation on each leg of the circuit and be sideways on each time it passes the pilot.
 - d. Land on the original take off point.

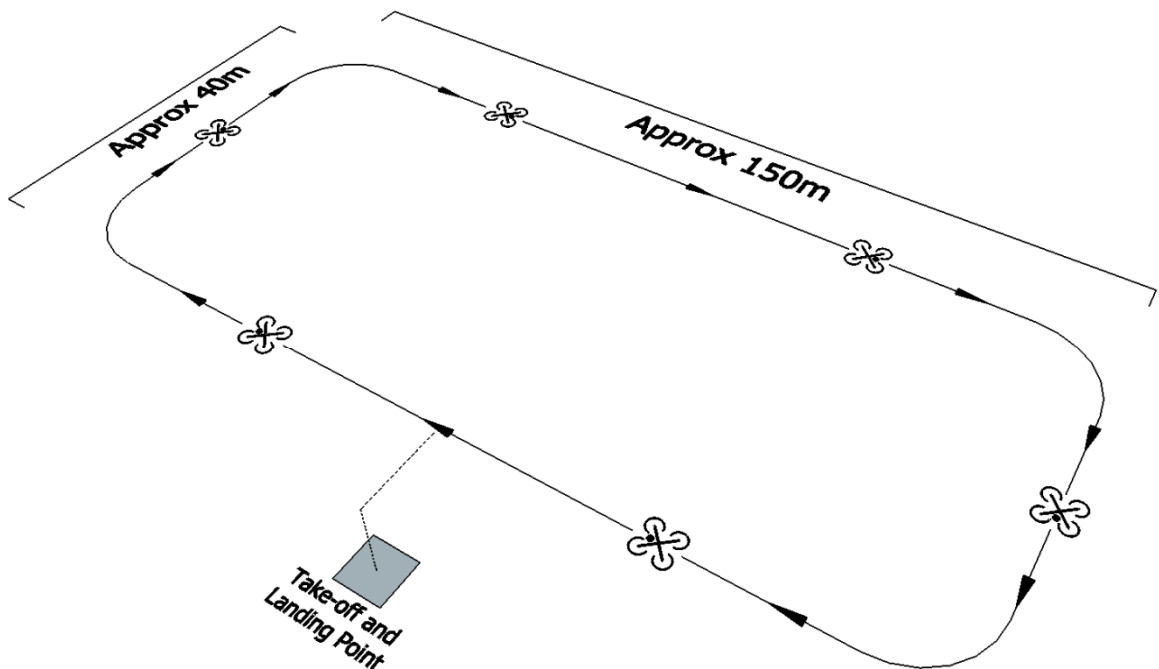


Figure 3 – Assessment step 5 (left-hand)

6. Complete post flight checks as required by the BMFA Safety Codes and CAA Drone Code. (see page 4).

Pre & Post Flight Checks

At the relevant points in the assessment, the Assessor will be looking for evidence that the candidate addresses issues related to the safe use of the model. These checks will depend on the type and sophistication of the model in question so candidates are required to 'talk through' what they are doing and answer any questions the Assessor may have.

Checks at the start of a flying session

General:

Use the BMFA SWEETS acronym to assess local conditions and procedures, viz:

Sun	position and strength
Wind	direction and strength
Eventualities	What would I do if...?
Emergencies	How would I cope with...?
Transmitter Control	Am I pegged on?
Site Rules	Am I adhering to NMFC club rules?

Model:

- Check that the model has not suffered any damage in transit
- Check that all rotor blades are in good condition and correctly attached

Where possible/appropriate:

- Check the integrity of all mechanical linkages
- Check the receiver/GPS aerials are secure, in good condition and correctly oriented

Transmitter/flight controller

- Check that the control equipment is adequately charged
- Where possible, verify communication with the model by carrying out a range check

Checks before every flight

General:

Consider the relevant issues in the BMFA SMART acronym, viz:

Switch on	Understand the start procedure for the model in question
Model selected	
Aerial extended/secure	
Rates / switches set	including selection of the appropriate flight mode
Transmitter voltage	

Model:

- If the model has folding/retractable components, check that they are secure
- Check that the flight battery is adequately charged and correctly/securely fitted
- Check that the model is 'safe' before placing it at the take-off point
- Check the condition of any status or warning lights.

Transmitter/flight controller

- Check the condition of any status or warning indicators

Checks after every flight

- Check that the model is 'safe' before retrieving it from the landing point
- If the model suffers damage or a heavy landing, carry out the daily checks above

Section 3: Mandatory Questions

The Assessor will ask the candidate to give satisfactory answers to at least 5 of the questions listed below.

Q1 Who regulates all civil flying activities over the United Kingdom, including model aircraft?

A The Civil Aviation Authority

Q2 How are the rules and regulations for flying established in law by Parliament (statute)?

A As a series of Articles contained within in the Air Navigation Order (ANO).

Q3 What does Article 240 (previously 137) of the ANO state?

A 'A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft.'

Q4 What does Article 241 (previously 138) of the ANO state?

A 'A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property.'

Q5 Who is legally responsible to ensure that a model is flown safely?

A The pilot in command.

Q6 According to CAP 658, which model aircraft are required to have an operating failsafe and what is the minimum setting?

A

- 1) Any aircraft >7kg*
- 2) Any Gas Turbine powered aircraft*
- 3) Any powered model aircraft fitted with a receiver capable of operating in failsafe mode*

As a minimum, reduce the engine(s) speed to idle on loss or corruption of signal.

Q7 What does Article 94 (previously 166) of the ANO say about the responsibilities of the person in charge of a small unmanned aircraft?

A The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.

Q8 What does Article 94 (previously 166) of the ANO say about visual contact with small unmanned aircraft?

A The person in charge must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.

Q9 What does Article 94 (previously 166) of the ANO say about small unmanned aircraft above 7kg?

A The person in charge of a small unmanned aircraft which has a mass of more than 7 kg must only fly the aircraft:

- Clear of controlled airspace unless with Air Traffic Control (ATC) permission.*
- Clear of any Aerodrome Traffic Zone (ATZ) unless with ATC permission.*
- At less than 400 ft above the point of launch except with permission as above.*

- Q10** What does Article 94 (previously 166) of the ANO say about 'commercial operation' (previously referred to as aerial work) for small unmanned aircraft?
- A The person in charge of a small unmanned aircraft must not fly the aircraft for the purposes of aerial work except in accordance with a permission granted by the CAA.*
- Q11** How is a flight for the purpose of 'commercial operation' (previously referred to as aerial work) defined?
- A Any flight for which 'valuable consideration' is given or promised in respect of the flight or the purpose of the flight. Essentially any gain you may make from the work undertaken.*
- Q12** How is 'a small unmanned surveillance aircraft' defined?
- A An aircraft which is equipped to undertake any form of surveillance or data acquisition.(this includes all camera equipped aircraft)*
- NOTE: The provision of data solely for the use of monitoring the model is not considered to be applicable to the meaning of 'surveillance or data acquisition'.*
- Q13** What are the separation requirements of Article 95 (previously 167) - for small unmanned surveillance aircraft - when operating over or within a congested area or organised open-air assembly of more than 1,000 persons?
- A The aircraft must not fly over or within 150 metres of a congested area or organised open-air assembly of more than 1,000 persons*
- Q14** What are the separation requirements of Article 95 (previously 167) - for small unmanned surveillance aircraft - in respect of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft?
- A The aircraft must not fly within 50 metres of any vessel, vehicle or structure not under the control of the person in charge of the aircraft.*
- Q15** Except during take-off and landing, what are the separation requirements of Article 95 (previously 167) - for small unmanned surveillance aircraft – excluding the person in charge of the aircraft or anyone under their control ?
- A The aircraft must not fly within 50 metres of any person*
- Q16** What must be obtained before any flight within controlled airspace or an ATZ of an aircraft over 7kg?
- A Obtain permission from the appropriate air traffic control unit.*
- Q17** What must be obtained before any flight within controlled airspace or an ATZ of an aircraft over 7kg?
- A Obtain permission from the appropriate air traffic control unit.*
- Q18** CAA General Exemption E 4049 - permits FPV flight without a buddy box, but with a competent observer. (a) How must the competent observer monitor the flight and (b) What is the maximum mass of aircraft that may be flown under this exemption?
- A (a) The competent observer must maintain direct unaided visual contact with the model at all times*
(b) The aircraft must be below 3.5kg including batteries and fuel

Q19 Who has legal responsibility for the safety of an FPV flight a) conducted with a buddy box lead and b) conducted without a buddy box lead ?

A (a) *The person in charge who must maintain direct unaided visual contact with the model at all times*

(b) *The person piloting the aircraft (SUA)*

Q20 According to CAP 658 what are the 8 'Only fly if' checks for an FPV flight of an aircraft over 3.5kg?

- A**
- *The activity is solely for 'sport and recreation' purposes;*
 - *Two pilots take part;*
 - *A Buddy Box system is employed;*
 - *The person in charge operates the master transmitter;*
 - *The person in charge does not wear the headset or view a screen;*
 - *The aircraft remains within the natural unaided visual range of the person in charge;*
 - *Reliable operation of the Buddy Box is established; and*
 - *A clear handover protocol is established.*

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Acknowledgements

The NMFC Helicopter and Multi-rotor Assessment is based on elements of the BMFA Helicopter and Multi-rotor Basic Proficiency Certificates, published on the BMFA Achievement Scheme Website (<http://achievements.bmfa.org/>).

The BMFA Certificate tests may only be carried out by BMFA authorised examiners.