8. LEGAL CONTROLS OVER MODEL FLYING

The sport of model flying is subject to various legal controls which should be carefully considered at all times. You are personally responsible for any flights you make and knowledge of your legal responsibilities is important.

8.1 The Air Navigation Order (ANO)

Definition: “Small unmanned aircraft” (SUA) means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight

The ANO is the legal framework which covers all flying activity in the UK. It is administered by the Civil Aviation Authority (CAA) and has been ratified by Act of Parliament. This means that the ANO is part of the body of law of the UK and, if you break it, you are liable to criminal prosecution.

However, model flying has been exempted from most of the clauses of the ANO. The current ANO is CAP 393, 2016 No.765. **The main clauses that still apply are 241, 240, 94 and 95**.
The ANO makes it illegal to fly any SUA above 400 feet; **however** the CAA have issued a Permission and Exemption which allows members of the BMFA, the Scottish Aeromodellers Association (SAA), The Large Model Association (LMA) and FPV UK to continue operating 'conventional' model aircraft (excluding multi-rotors) weighing less than 7Kg at heights in excess of 400ft. An exemption has also been given that allows members to operate 'conventional' model aircraft (excluding multi-rotors) weighing less than 3.5Kg at heights up to 1000ft using first person view (fpv). An exemption has also been granted for gliders in excess of 7kg, but not exceeding 14kg to fly at height in excess of 400ft above the surface of the earth beneath it, provided the aircraft is not flown at a height greater than 400ft above the remote pilot at any time.

Note that any model aircraft flying in within 1 kilometre of the boundary of a licensed airfield at any height will have to be with the permission of the airfield air traffic control or airfield operator.

Article 241

> **“A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property”**

Article 240

> **‘A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft’**

THESE APPLY TO ALL MODEL AIRCRAFT AT ALL TIMES

Article 94 (Small Unmanned Aircraft requirements)

(1) A person shall not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a small unmanned aircraft so as to endanger persons or property

(2) The remote pilot of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.

(3) The person in charge of a small unmanned aircraft 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.

(4) If a small unmanned aircraft has a mass of more than 7kg excluding its fuel but including any articles or equipment installed or attached to the aircraft at the commencement of its flight, the SUA operator must not cause or permit the aircraft to be flown , and the remote pilot in charge of the aircraft must not fly it-

(a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained (effectively in any controlled airspace down to ground level – Ed); or

(b) within an aerodrome traffic zone during the notified hours of watch of the air traffic control unit (if any) at that aerodrome unless the permission of any such air traffic control unit has been obtained.

(4A) Paragraph (4) does not apply to any flight within the flight restriction zone of a protected aerodrome (for details please see 'The Air Navigation (Amendment) Order 2018 - 2018 No 623 – Ed.)

(5) The SUA operator must not cause or permit a small unmanned aircraft to be flown for the purposes of commercial operations, and the remote pilot of a small unmanned aircraft must not fly it for the purposes of commercial operations except in accordance with a permission granted by the CAA.

Article 95 (Small unmanned surveillance aircraft)

(1) The person in charge of a small unmanned surveillance aircraft must not fly the aircraft in any of the circumstances described in paragraph (2) except in accordance with a permission issued by the CAA.

(2) The circumstances referred to in paragraph (1) are—

(a)over or within 150 metres of any congested area;

(b)over or within 150 metres of an organised open-air assembly of more than 1,000 persons;

(c)within 50 metres of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft; or

(d)subject to paragraphs (3) and (4), within 50 metres of any person.

(3) Subject to paragraph (4), during take-off or landing, a small unmanned surveillance aircraft must not be flown within 30 metres of any person.

(4) Paragraphs (2)(d) and (3) do not apply to the person in charge of the small unmanned surveillance aircraft or a person under the control of the person in charge of the aircraft.

(5) In this article, “a small unmanned surveillance aircraft” means a small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.

9. THE BMFA GUIDELINES AND SAFETY CODES FOR MODEL FLYING

9.1 CAP 658

During 1996 the Civil Aviation Authority (CAA) issued Civil Aviation Publication 658 (CAP 658), Small (Model) Aircraft: A Guide to Safe Flying.

This document gives advice for all model flyers, much of which is based on the existing BMFA Safety Codes. Extracts from the latest version of CAP 658 (June 2013) are included in this handbook where appropriate.

Whilst the recommendations in CAP 658 are not regarded as legal requirements, one of the reasons why it is issued by the CAA is to provide a guide to what would be considered 'reasonable practice' in the event of a model flyer being prosecuted by them under the Air Navigation Order.

This makes CAP 658 an important document for all model flyers and it can be downloaded from the BMFA web site or direct from:

http://publicapps.caa.co.uk/CAP658

BMFA NOTE: All model clubs of any type (R/C or FF) should obtain and read a copy for their own information and protection.

9.2 Introduction to the Safety Codes

Accident statistics and the low insurance rates that BMFA Member's enjoy show that model flying is not a dangerous sport but, as with other sporting activities, hazards can arise if common sense rules are not applied. It is important that we all follow safe model flying practice and the BMFA Safety Codes are designed to help everyone achieve this.

The BMFA Safety Codes presented here are available to all model flyers and show you ways to fly your models safely, based on over half a century of experience.

Sections are available covering all model flying activities, including displays and competitions and there are many additional booklets on specific subjects giving detailed information. These can all be downloaded from the BMFA web site or obtained directly from the Leicester Office..

At some flying sites, circumstances may dictate that additional safety measures beyond those indicated in this handbook might have to be taken. Examples could be limiting the number of spectators or the number of models being flown at any one time.

With the advent of small electric models that can be flown from small sites, such as football pitches, you may also have to think carefully about the size and type of aircraft that you can safely fly from such sites.

As the pilot it is ultimately your decision as to what and where you fly but the range of types and sizes of model currently and easily available to you means that you may have to give the subject of suiting

your model to your flying site much more thought than it needed in the past.

The Association wishes to encourage any safety initiatives wherever they may be thought necessary by the users of any site and, indeed, any suggestions about the contents of the Safety Codes and the Handbook in general will be welcomed.

Finally – remember that your attitude to safety can affect the whole image of model flying.

Model flying must not only BE safe – it must be SEEN to be safe.

9.3 Respect the Environment

Much model flying takes place in countryside locations and many clubs and individuals fly in places of natural beauty or Sites of Special Scientific Interest (SSSI). Wherever you fly you should take steps to minimise the impact on your surroundings.

Our aim as model flyers should be to leave any flying site in the same condition that we found it. Clearly, leaving litter or damaging property are not acceptable.

Model flyers should be familiar with the basic provisions of the Countryside Code which is compiled by Natural England and applies to all of the countryside in England and Wales. Most of it is just good commonsense as it is designed to help us all to respect, protect and enjoy our countryside.

9.4 'Mixed' Sites

Model flying does (and can continue to) take place safely on sites where other airspace users are operating at the same time close by.

Because, in all such cases, the other users always involve 'people carrying' aviation e.g. gliding, hang-gliding, paragliding, parachuting, light aviation etc. **the model flyer must accept that his needs are going to be secondary to the safety of the other user**. Indeed, this point is specifically covered by the Air Navigation Order.

9.5 Military Low Flying

Military aircraft may conduct low flying exercises over much of the UK on any weekday and the sudden appearance of a low flying military aircraft is difficult to anticipate. However it is vital to be aware of the problem and to remember that one aircraft may be the first in a stream of three or four. In areas known to be used for low flying a dedicated lookout is considered essential.

On **WEEKDAYS** only, on flying sites where low level flying by military aircraft is **KNOWN** to take place and where a club is planning to operate **FIVE or MORE** models at any one time, the CANP reporting procedures outlined in CAP 658 can be used. If possible call the day before the activity. A minimum of four hours notice is required to allow full circulation of the information.

15.12 Failsafes

(a) CAP 658 says:

> **For All Model Aircraft**
>
> Any powered model aircraft fitted with a receiver capable of operating in failsafe mode (i.e. PCM receivers, Digital Signal Processing (DSP) receivers or 2.4 GHz equipment) must have the failsafe set, as a minimum, to reduce the engine(s) speed to idle on loss or corruption of signal.
>
> This means that you will have to carefully consider what type of receiver you are using in ANY i/c or electric powered model, even the smallest.
>
> **For Models Weighing 7 to 20 kg**
>
> A serviceable 'fail-safe' mechanism should be incorporated to operate on loss of signal or detection of an interfering signal. For example on a power driven model this should operate, as a minimum, to reduce the engine(s) speed to idle.

(b) All 2.4 GHz equipment have settable failsafe modes and if you are using any one of these then you must take care to set the failsafe to at least engine idle.

> For over 7 kg, you must ONLY use failsafe settable equipment and, again, set to engine idle as a minimum.

(c) 2.4 GHz equipment often defaults to 'hold last position' out of the box so if you don't set the failsafe, then that's what it will do. This means that, for even the smallest model, interference or loss of signal will mean throttle and control lock-on and a potential flyaway or high throttle, high energy impact. If ever you re-bind a model please remember to recheck the failsafe as some sets may revert to default settings under these circumstances.

(d) Users of any failsafe capable radio equipment (PCM, DSP or 2.4 GHz) should check fail-safe operation before each flying session. With the model restrained, switch off the transmitter and ensure that all relevant controls on the model move to their pre-set fail-safe positions. Switch the transmitter on again and make sure that normal control operation returns within a few seconds. If the fail-safe does not re-set quickly there may be a fault so **DO NOT FLY.** Also remember that if the failsafe is set to retract the undercarriage the model will need supporting off the ground.

> To be safe, You must take the positive step of specifying what your failsafe should do instead of leaving it set at default. Read your radio manual carefully for details of settings.
>
> If you don't initially understand the instructions for setting the failsafe on your equipment then you MUST take steps to find out how to do it. This is one thing you cannot ignore and ignorance of the procedure is not an excuse that can be accepted.

15.22 Transmitter and Receiver Issues

With new or repaired radio control equipment, a ground range check is essential, preferably in a model and with the model's engine running if possible. Check the manufacturer's literature or website for guidance on your transmitter or, if this is not possible, look for a minimum range of between 30 and 50 metres with the transmitter aerial down and no servo jittering.

2.4 GHz equipment usually has a 'range check' button that enables a ground range check to be done, even though the aerial cannot be altered. It is recommended that you make use of this facility regularly so that you can monitor the performance of your radio.

It is good practice to carry out a routine range check on your equipment at regular intervals, at least every month or so, and a check is advisable if you have not flown for a few weeks. You should also be prepared to do a range check if you feel that you have a problem with your radio equipment or if you have removed and replaced crystals or a transmitter module. If the model has a spark ignition or electric motor then the range check should always be carried out with the engine running.

18. GENERAL MODEL SAFETY

18.1 General Safety

(a) Models should be built to a standard such that they will not fail under normal circumstances, giving particular attention to control surfaces and connections.
(b) They should be thoroughly checked prior to each flying session and after any hard landing.
(c) It is recommended that rounded spinners or safety propeller nuts of the domed type are fitted to internal combustion and electric powered models and that gliders and pusher powered aircraft noses should also be rounded (no needle noses)
(d) Care should be taken by the operator that propellers are of suitable size and construction for their engine or motor's operating speed. All propellers should be carefully balanced. Cheap and efficient propeller balancers are available from your local model shop.
(e) Do not use propellers on i/c engines that are designed for use on electric motors.
(f) On internal combustion engines and electric motors, damaged propellers must not be used. Inspect your propellers regularly and replace any that are not in good condition
(g) Metal propellers must not be used.
(h) The use of locking prop nuts is recommended, especially for 4-stroke engines. A backfire or ‘kick’ can loosen a prop nut and locking nuts will prevent the propeller flying off. The safety factor of locking prop nuts on four-stroke engines is more important than the recommendation to use ‘domed’ safety nuts so, if you have to choose, go for the locking nuts.
(i) Heavy ballast, or any other heavy part, subject to jettisoning in flight is prohibited. Jettisonable ballast must be of a safe nature e.g. water.
(j) All R/C models are subject to in-flight vibration, landing knocks, transport damage etc. Be sure that receivers and batteries are well protected, servos are fixed securely, control linkages (pushrods, snakes, closed loop etc.) are robust enough for their purpose, are properly supported where necessary and are as slop free as possible and that all control surface hinges and horns are fitted correctly. Pushrod clevises should fit control horns cleanly with no sideways strain and they should be fitted with a plastic or silicone tube ‘keeper’ as a secondary closure.
(k) When starting an engine make sure that the model is restrained and cannot move forward. Restraint is best done by either a helper or by some mechanical means.
(l) Never put yourself in a position where your face is in line with a turning propeller. A broken propeller will fly out and forward so make all engine adjustments from the rear if possible. A broken propeller will also be a danger to anyone standing nearby so take care that no-one is in line with it when starting your engine.

18.2 A Safer Flying Field and You

When you arrive at a flying field and before you start flying, we recommend that you take a few moments to consider the surroundings and the flights you will be making.

Think **S.W.E.E.T.S.**

S - Sun W - Wind E - Eventualities E - Emergencies (Inc. Failsafes) T - Transmitter Control S - Site Rules

Sun – Where is the sun in relation to where you will be flying? Will it affect your flight patterns? What actions will you take if you accidentally fly 'through' the sun? Should you be wearing sunglasses? Remember that low sun in winter can be a particular problem.

Wind – Consider the wind strength and direction. How will this affect your flights? Will you have to modify your normal take-off and, especially, your landing patterns? From your local knowledge, will there be any turbulence with 'this' wind direction and strength? And how bad might it be?

Eventualities – What will you do if you hear or see a full size aircraft or helicopter flying at low level near the field? What if the landing area is suddenly obstructed when you are on finals to land? What will you do if a nearby footpath or bridle path suddenly has walkers or horses on it?

Emergencies – You may have an engine cut at any part of a flight so consider where your deadstick landings might be safely made and which ground areas you should definitely avoid. How will you warn other field users if you have an emergency? You may also have a complete loss of signal and therefore before every flight you should check that the failsafe is working how you expect it to.

Transmitter Control – Is the site pegboard in operation? If not, why not? Where has the pegboard been placed? Are you familiar with the system and understand how it works?

Site Rules – Are there any specific site rules you should be aware of? Most importantly, where are the no-fly zones or dead airspace areas on the site? The answers to most of these questions are contained within these Safety Codes and your local Club rules but you will be making the final decisions as to whether flights can be made safely. If conditions are poor or a site is unsuitable remember that a decision not to fly can be both valid and sensible. We would also recommend that you review the sections on the sun and wind throughout the day as they obviously change over time and this may affect some of the decisions you will be making.

18.3 Radio Control Flying Safety

(a) Before you do anything else, make sure that you understand and are complying with the field frequency control system. NEVER switch on until you are sure it is safe. ALWAYS check the pegboard – on EVERY flight.
(b) Before every flight, check that transmitter trims, rate switches etc. are in their correct positions and that each control surface on the model moves freely and in the correct sense.
(c) Immediately before take-off, flight controls must be checked for full, free and correct movement under full power if applicable. If there are any doubts as to their operation, **DO NOT FLY**.
(d) Flyers using adjacent frequency channels should first perform an interaction check. If they regularly operate together they should perform the check every two or three months.
See the previous section on Radio Control and Your Club for details of the simple check you should perform**.**
(e) Inexperienced R/C flyers should never fly without an experienced helper.
(f) Unless positive controls are in force, all flyers should use the same take-off area at any particular flying session.
(g) Do not taxi in or out of the pits area. Wheel or carry your model well clear of the pits before commencing taxying and stop the model well clear when taxying back after landing. Do not put other flyers at risk.
(h) Before take-off, check that both ground and sky are clear and never take off or land towards other pilots, spectators or the pits area.
(i) Always make the initial turn after take-off away from spectators and parking areas. Diving manoeuvres should always be pointed away from spectators, parking areas and other people.
(j) Always maintain a clear view of the model and allow plenty of room between the flight path and spectators, other flyers or model pit areas.
(k) **DO NOT OVERFLY** houses, domestic gardens, car parks, traffic, railways, organised games or spectators. You may not be able to control people walking by at a reasonable distance from the take off/landing area but you should take care not to overfly them at low level.
(l) At any sign of malfunction or jettisoning of model parts, land as soon as it is safe to do so.
(m) Do not distract pilots, particularly when they are controlling models taking off or landing.
(n) Clubs should exercise strict control over the take-off/landing area used. Pilots about to take off should inform people already flying. Pilots landing should have priority but must call out their intentions ‘loud and clear’ and must **NEVER** assume that they have been heard. A pilot going out to take off may not hear a call over the noise of his model's engine.
(o) **NEVER** assume that the landing area is clear even if you have called landing. In emergency situations call for help from your fellow flyers and always be prepared to land in a safe place off the landing area if necessary. In **ALL** cases, the safety of people is paramount.
(p) Care must be taken at all times to avoid overflying operating transmitters. Pilots should stand together and should not be allowed to wander over the flying area when operating transmitters. Clubs should take action to prevent operating transmitters being taken out on to an active flying area when, for example, models are being retrieved (see the section on ‘Radio Control at your Club’). There are

exceptions to this particularly in some silent flight operations, and extreme care should be taken not to overfly transmitters in these cases.
(q) Under no circumstances whatsoever should you move to the far side of the flying area so that you can land your model between yourself and the pits area.
(r) Under no circumstances whatsoever should you fly between yourself and the pits area.
(s) Take extra care when flying in adverse weather conditions. It is easy to lose sight of your model in fog or low cloud. Strong winds and turbulence can be a stimulating challenge but can catch out the unwary. Flying in rain can give serious radio problems if water gets inside your transmitter.
(t) The staging of deliberate mid-air collisions at airshows and public displays is banned and they are not covered by the Association's insurance.

18.4 Pre Flying Session Model Checks

On arrival at the flying site:
(a) Check airframe for any transit damage.
(b) Check that servos and linkages are secure.
(c) Check undercarriage for secure fixing and correct alignment.
(d) Check propeller for damage and secure fixing.
(e) Check receiver aerial for damage and, with 2.4 GHz equipment, that the orientation is correct.
(f) Carry out a range check **i**f any changes or re-installation of equipment have taken place since the last session or if a history of range problems exists.
(g) Carry out a failsafe check and make sure that it does what you expect.
(h) Check that the receiver and transmitter batteries have sufficient capacity for the intended use.

18.5 Checks Before Each Flight

(a) Obtain frequency clearance - not required for 2.4ghz
(b) Pay particular attention to using the correct sequence appropriate to your model.
For 2.4 GHz, you should be aware of any local transmitter usage limitations and if a flight peg is required, it must be obtained before the usual Tx on, Rx on sequence.
Note that some radio equipment and occasionally a specific model set up, require that the Rx be switched on first. If this is so take extra care.
(c) Check that all controls operate freely and do not bind or stick at any point in their movement.
(d) Check that all controls move in the correct sense. For conventional models, stand behind the model and look for;

> Elevator stick back – Elevator comes up. Aileron
> stick right – Right hand aileron comes up.
> Rudder stick right – Rudder moves to the right.

(e) Check that all control surfaces are in their correct positions with the transmitter trims at neutral.
(f) Look for any minor radio malfunctions such as slow or ‘jittery’ servos, glitches etc.
If in doubt, DO NOT FLY.
(g) Check Rx and Tx battery capacity is sufficient for the intended flight with an added safety factor.

(h) **With electric models**

(i) The first and most important principle of electric flight ground safety is to understand that the instant you start to plug in the flight battery, the model you are holding may transform itself from a dead airframe into one with its motor running at full revs and all controls moving. No matter how good your other safety checks, you must be prepared for this to happen every single time you start to connect the flight battery. If a separate Rx battery is fitted then you have the opportunity to check the operation of the radio equipment before the flight battery is plugged in.

(ii) Since plugging in the flight battery is nearly always a two-handed job you must give serious thought to how your model will be restrained BEFORE it does something you don't expect. When plugging in, positive restraint, either by a helper holding the model or by some other method, and staying completely clear of the propeller must always be part of your regular routine.

(iii) Electric motors have very different power and torque characteristics to normal IC model engines. You must take very great care when setting up their control systems and handling them as an accident, such as the propeller hitting your hand, which would stall a glow engine, might just make an electric motor turn even harder.

(iv) Just before you go out to fly, **DOUBLE CHECK** that all transmitter trims, rate switches, mixers etc. are in their correct positions and that the transmitter meter is 'in the green' or that you have the correct model selected and that your aerial is extended.

(v) Finally, with the aircraft held securely (usually on the ground for i/c models but not if the failsafe is set to retract the undercarriage), open up to full power and re-check all flying controls again for full and free movement, also noting any glitches, hesitations or odd vibrations. If ANYTHING seems odd, DO NOT FLY

(I) **Be S.M.A.R.T**. with your transmitter.

S .... Switch on
M .... Model selected is correct
A .... Aerial secure / extended
R .... Rate switches all in correct positions
T ..... Transmitter voltage good and **Trims** all in correct position

18.6 Checks After Each Flight

(a) Receiver OFF then transmitter OFF (Unless your equipment manufacturer specifies otherwise).
(b) Clear the frequency control system.
(c) Clean the aircraft down
(d) Check propeller, airframe, undercarriage, wing fixing etc. for security of fastening and for possible flight or landing damage.
(e) **REMEMBER** – Never fly with a damaged aircraft or propeller, or with any possible radio problem.