

Safety Regulation Group



CAP 658

Model Aircraft: A Guide to Safe Flying

www.caa.co.uk

Safety Regulation Group



CAP 658

Model Aircraft: A Guide to Safe Flying

February 2012

© Civil Aviation Authority 2012

All rights reserved. Copies of this publication may be reproduced for personal use, or for use within a company or organisation, but may not otherwise be reproduced for publication.

To use or reference CAA publications for any other purpose, for example within training material for students, please contact the CAA at the address below for formal agreement.

ISBN 978 0 11792 583 0

First edition December 1995

Second edition 27 June 2003

Third edition August 2006

Third edition (Corrected) August 2006

Third edition including amendment 1/2007 dated 30 April 2007

Fourth Edition February 2012

Enquiries regarding the content of this publication should be addressed to:
Flight Operations Inspectorate (General Aviation), Safety Regulation Group, Civil Aviation Authority,
Aviation House, Gatwick Airport South, West Sussex, RH6 0YR.

The latest version of this document is available in electronic format at www.caa.co.uk, where you may also register for e-mail notification of amendments.

Published by TSO (The Stationery Office) on behalf of the UK Civil Aviation Authority.

Printed copy available from:

TSO, PO Box 29, Norwich NR3 1GN
Telephone orders/General enquiries: 0844 477 7300
Fax orders: 0870 600 5533

www.tsoshop.co.uk
E-mail: caa@tso.co.uk
Textphone: 0870 240 3701

List of Effective Pages

Chapter	Page	Date	Chapter	Page	Date
	iii	February 2012			
Contents	1	February 2012			
Contents	2	February 2012			
Glossary	1	February 2012			
Chapter 1	1	February 2012			
Chapter 2	1	February 2012			
Chapter 2	2	February 2012			
Chapter 2	3	February 2012			
Chapter 3	1	February 2012			
Chapter 3	2	February 2012			
Chapter 4	1	February 2012			
Chapter 5	1	February 2012			
Chapter 5	2	February 2012			
Chapter 6	1	February 2012			
Chapter 6	2	February 2012			
Chapter 6	3	February 2012			
Chapter 6	4	February 2012			
Chapter 6	5	February 2012			
Chapter 6	6	February 2012			
Chapter 6	7	February 2012			
Chapter 6	8	February 2012			
Chapter 6	9	February 2012			
Chapter 6	10	February 2012			
Chapter 7	1	February 2012			
Chapter 7	2	February 2012			
Chapter 8	1	February 2012			
Chapter 9	1	February 2012			
Chapter 10	1	February 2012			
Chapter 11	1	February 2012			
Chapter 12	1	February 2012			
Chapter 12	2	February 2012			
Chapter 12	3	February 2012			
Chapter 12	4	February 2012			
Chapter 13	1	February 2012			
Chapter 14	1	February 2012			
Annex A	1	February 2012			
Annex A	2	February 2012			
Annex B	1	February 2012			
Annex C	1	February 2012			

INTENTIONALLY LEFT BLANK

Contents

Glossary

Chapter 1	General Information	
	Introduction	1
Chapter 2	Legal Requirements	
	Definition of a Model Aircraft	1
	Legal Definition of a Small Unmanned Aircraft	1
	Aviation Regulation that Applies to Model Aircraft and Large Model Aircraft	1
	Model Aircraft Regulations	1
	Large Model Aircraft Regulations	3
	Article 137 – Endangering Safety of an Aircraft	3
Chapter 3	Large Models between 20 kg and 150 kg Exemptions and Permissions	
	The Need for Exemption	1
	Design and Build Advice and Inspection	1
	Exemptions	1
	Large Models Over 150 kg	2
Chapter 4	Learning to Fly	
	Local Model Flying Clubs	1
	Learning to Fly Without a Model Flying Club	1
	Commercial Model Flying Training	1
Chapter 5	Safety Considerations	
	Any Model Aircraft Flying	1
	Additional Requirements – Models Having a Mass from 7 kg to 20 kg	1
	Air Traffic Control and Controlled Airspace	2
Chapter 6	Flying Radio Controlled Models	
	General	1
	Radio Controlled Helicopters	4
	Gas Turbine Powered Models	5
	Radio Controlled Silent Flight (Gliders and Electric Powered Models)	6
	Electroflight	8
	Seaplanes	8
	First Person View (FPV) Radio Control (R/C)	9

Chapter 7	Other Models	
	Free Flight Models	1
	Control Line Models	1
	Rockets	1
Chapter 8	Control Frequencies	
Chapter 9	Model Flying Sites – Models Over 7 kg	
Chapter 10	Electricity Board Guidelines	
Chapter 11	Military Low Flying	
Chapter 12	Model Displays	
	General	1
	Permissions	1
	Organisation	1
	Flight Line Marshal	2
	Police and Emergency Services Liaison Officer	2
	Radio Control Display Sites	2
	Site Layout	3
	Weather	4
	Control Line Display Sites	4
	Ground Special Effects Safety	4
Chapter 13	Occurrence Reporting	
	Definitions	1
	General Flying	1
	Public Events (Displays or Competitions)	1
	Contact Details	1
Chapter 14	Aerial Work	
	Aerial Work Defined	1
	Valuable Consideration Explained	1
Annex A	Useful Addresses and Telephone Numbers	
Annex B	Relevant Legislation	
Annex C	Forms	

Glossary

ANO	Air Navigation Order
ARTF	Almost Ready To Fly
ATC	Air Traffic Control
ATZ	Aerodrome Traffic Zone
BMFA	British Model Flying Association
CANP	Civil Aviation Notification Procedures
EASA	European Aviation Safety Agency
FPV	First Person View
IC	Internal Combustion
LMA	Large Model Association
MATZ	Military Air Traffic Zone
R/C	Radio Control
SUA	Small Unmanned Aircraft
UAV	Unmanned Aerial Vehicle
UKRA	United Kingdom Rocket Association

INTENTIONALLY LEFT BLANK

Chapter 1 General Information

1 Introduction

The Civil Aviation Authority is empowered to regulate all civil flying activities over the United Kingdom, including model aircraft.

The rules and regulations for flying are contained in the **Air Navigation Order** as a series of **Articles**, established by parliamentary statute.

It is the legal responsibility of the operator of a model aircraft to ensure that the model is flown safely. This publication is intended to provide guidance to anyone intending to fly a model aircraft.

It is written in collaboration with the major UK aeromodelling associations who have provided much of the operational detail.

Guidance is also given beyond the statutory requirements, so that the experience of the aeromodelling associations can be of use to those new to flying model aircraft. The publication is laid out as a series of general chapters, applicable to the flying of any model, followed by more detailed information on flying particular types of aircraft, such as helicopters or seaplanes.

Nothing in this publication is intended to conflict with the Air Navigation Order or other legislation which, in case of doubt, must be considered as overriding.

A list of addresses of organisations referred to in this publication is given at **Annex A**.

This CAP, CAP 658, refers only to model aircraft used for sport and recreation. Guidance on the use of Unmanned Aerial Vehicles (UAVs) for aerial work is contained in CAP 722 *Unmanned Aircraft System Operations in UK Airspace – Guidance*.

Further advice on the operation of model aircraft and UAVs can be obtained from the CAA's Flight Operations Inspectorate (General Aviation) on +44 (0)1293 573540.

Some of the text of this publication is presented in the third person singular. For conciseness, the pronoun 'he' is used throughout. 'She' should be substituted when appropriate.

INTENTIONALLY LEFT BLANK

Chapter 2 Legal Requirements

1 Definition of a Model Aircraft

- 1.1 For the purposes of this document a 'model aircraft' is defined as any 'Small Unmanned Aircraft (SUA)' (0-20 kg) used for sporting and recreational purposes and a 'large model aircraft' is defined as any 'Unmanned Aircraft' (over 20 kg) used for sporting and recreational purposes. The Air Navigation Order (ANO) 2009 contains the legal definition of 'Small Unmanned Aircraft' and this definition is listed in this chapter.
- 1.2 The ANO uses the term 'small unmanned aircraft' rather than 'model aircraft' so that 'Unmanned Aerial Vehicles' (UAVs) and other flying machines are captured. This publication is specifically written to cover model aircraft used for sporting and recreation purposes and therefore the terms 'model aircraft' or 'large model aircraft' are used throughout.

2 Legal Definition of a Small Unmanned Aircraft

Small Unmanned Aircraft (Article 255) – 'Any unmanned aircraft, other than a balloon or kite, having a mass of not more than 20 kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight'.

NOTE: For electrically powered models the batteries must be included as part of the 20 kg limit. The batteries are in effect regarded as the fuel tank and electrons are regarded as the fuel.

3 Aviation Regulation that Applies to Model Aircraft and Large Model Aircraft

- 3.1 The ANO contains the regulations that apply to all aircraft including model aircraft and large model aircraft. The regulations are contained in a number of articles. The ANO can be obtained online at www.caa.co.uk/cap393.
- 3.2 Model aircraft are excluded from the vast majority of the regulations applied to other aircraft. Large model aircraft are not excluded from any of these regulations and therefore require an exemption to be issued prior to flying.
- 3.3 The legal requirement for safety is placed firmly on the operator of the model and the guidelines in Chapter 5 show what are considered reasonable conditions for the operation of models.

4 Model Aircraft Regulations

- 4.1 The regulations which **DO** apply to model aircraft are explained briefly in this Chapter and are listed in **Annex B**.
- 4.2 However, the most important regulations – articles 138, 166 and 167 of the ANO 2009 – deserve fuller explanation.
 - 4.2.1 **Article 138 – Endangering safety of any person or property**

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

All model flying activity is controlled by this article of the ANO and it is important that the operator of any model aircraft should bear this in mind at all times.

4.2.2 **Article 166 – Small unmanned aircraft**

- (1) A person must 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 person in charge 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) The person in charge of a small unmanned aircraft which has a mass of more than 7 kg excluding its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight, must not fly the aircraft:
 - (a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained;
 - (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; or
 - (c) at a height of more than 400 feet above the surface unless it is flying in airspace described in sub-paragraph (a) or (b) and in accordance with the requirements for that airspace.
- (5) 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.'

4.2.3 **Article 167 – 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.'

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'.

5 Large Model Aircraft Regulations

5.1 All large model aircraft having a mass of more than 20 kg (mass of model and equipment, but excluding fuel) require an exemption to fly. **A large model aircraft can only be operated under the terms of an Exemption issued by the CAA.**

5.2 An **EXEMPTION** is used to allow an exception to the established law. Such an exception is usually only made subject to various additional conditions to ensure adequate safety.

5.3 Anyone planning to build a very large model should first read **Chapter 3** and contact one of the modelling associations or the CAA to see if the proposed model is likely to be acceptable.

5.4 It is unlikely that an exemption will be issued without the condition that the model must be flown within the 'control' of a recognised model association and at a suitable site.

5.5 The maximum mass for a model aircraft to be treated under the guidelines of CAP 658 is 150 kg. Above this mass full airworthiness regulations may apply. Builders contemplating the construction of a model having a mass of more than 150 kg should contact the CAA prior to commencing construction.

6 Article 137 – Endangering Safety of an Aircraft

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

Article 137 refers to people in an aircraft endangering the aircraft or persons therein, whereas Article 138 refers to persons outside aircraft endangering aircraft. Obviously only Article 138 can apply to a model aircraft. However, technically Article 137 does apply to models over 20 kg.

INTENTIONALLY LEFT BLANK

Chapter 3 Large Models between 20 kg and 150 kg Exemptions and Permissions

1 The Need for Exemption

Large model aircraft having a mass between 20 kg and 150 kg are subject to all of the Rules or Articles of the Air Navigation Order.

As many of these Rules are practically impossible for the model operator to meet, the modeller must request a specific written Exemption to allow the model to be flown.

Any such Exemption will only be issued by the CAA subject to additional operating conditions and after it has been satisfied that the model is designed, built and test flown to a satisfactory standard.

Any person or group contemplating building an aircraft that is likely to have a mass of more than 20 kg but less than 150 kg should apply at an early stage to one of the modelling associations for advice. (See Annex A.)

The Large Model Association (LMA) operates a model inspection scheme on behalf of all UK Aeromodelling Associations.

2 Design and Build Advice and Inspection

The LMA will advise on the availability of a member in the builder's area who will be able to supervise and assist with the project.

The assisting member will be authorised to confirm satisfactory design and build standards to the CAA.

The build inspection schedule will be as agreed between the CAA and the LMA. Details of the schedule will be sent on request by the association contacted.

It is particularly important to build to such a schedule if the construction does not readily allow access to all parts of the model for a final inspection – such as box sections or composite airframes.

In the case of Almost Ready To Fly (ARTF) power models where the construction does not allow easy access to the structure, a manufacturer's specification sheet detailing the maximum engine capacity must be provided (where available) to the LMA inspector.

In certain circumstances a charge may be made for elements of the above inspection process.

3 Exemptions

3.1 Flight Test Only

Once the inspection schedule has been satisfactorily completed, it will be forwarded to the LMA who will issue a Certificate of Design and Construction. This certificate should be forwarded to the CAA with a request for the issue of an Exemption – Test Only.

Any special operating conditions applicable to the model can also be advised by the LMA at this stage.

The Exemption – Test Only is valid for one year and will only permit flights in private (away from the public). During this time a Flight Test Log is to be completed. Details and guidance notes about the completion of the Flight Test Log are available from the LMA.

The Exemption – Test Only will not normally be renewed after its expiration.

On satisfactory completion, the Flight Test Log should be returned to the LMA who will then recommend the issue of an Exemption.

An Exemption is specific to a model and named pilot. No other person can legally fly the model.

3.2 **Flight Exemption**

Once the Flight Test Schedule has been satisfactorily completed and a Flight Test Log submitted, the LMA will make a recommendation to the CAA for the issue of an Exemption. Any such Exemption issued will include any special operating conditions. The Exemption is valid for one year and can be renewed by application to the CAA with a statement that no changes have been made to the model.

If any changes have been made to the model it will have to be re-inspected and a new Exemption – Test Only issued.

The CAA does not charge for the issue of Exemptions.

3.3 **Gliders Having a Mass Between 20 kg and 80 kg**

Pure gliders having a mass between 20 kg and 80 kg do now need an Exemption from the CAA before they may be flown. Therefore, before a model glider between these masses is built the advice of either the LMA or the British Model Flying Association (BMFA) should be sought on construction, testing and operating techniques.

3.4 **Gliders Having a Mass Over 80 kg**

Pure gliders having a mass over 80 kg require an approval from the European Aviation Safety Agency (EASA) (refer to Annex II to Regulation (EC) No. 216/2008).

4 **Large Models Over 150 kg**

Before commencing construction, the Airworthiness Division of the CAA should be contacted to ascertain requirements (see Chapter 2, paragraph 5.5, and Annex A for contact details). An approval from EASA may also be required.

Chapter 4 Learning to Fly

1 Local Model Flying Clubs

If it is at all possible, contact and join a local model flying club – there is no doubt that this is the best way to learn to fly.

There are many hundreds of model flying clubs in the UK and most of them offer training in radio control flying to beginners in the sport.

Details of your local clubs can be obtained from the Associations listed in **Annex A**, or you could enquire at your local model shop.

2 Learning to Fly Without a Model Flying Club

It is not impossible to learn to fly without being a member of a club, but it can be very difficult.

If you are unable to join a club to learn to fly, then try to get help from an experienced model flyer who will be able to guide you in your first efforts.

Chapter 6 gives basic advice on radio controlled model flying.

3 Commercial Model Flying Training

There are a number of organisations and individuals offering commercial model flying training.

Details of these operations are listed in specialist model flying magazines or may be obtained from local model shops.

FLYING WITHIN A CLUB IS THE BEST WAY TO BE SAFE.

INTENTIONALLY LEFT BLANK

Chapter 5 Safety Considerations

1 Any Model Aircraft Flying

First

Choose an unobstructed site and at all times keep a safe distance from:

- PERSONS
- VESSELS
- VEHICLES
- STRUCTURES

Only Fly

- In suitable weather.
- With regard for any other conditions such as local bye-laws.
- With due consideration for other people and property.
- With the model in direct unaided visual line of sight at all times.
- If reasonably satisfied that the flight can be made safely.

Failsafes

Any powered model aircraft fitted with a receiver capable of operating in failsafe mode should have the failsafe set, as a minimum, to reduce the engine(s) speed to idle on loss or corruption of signal.

2 Additional Requirements – Models Having a Mass from 7 kg to 20 kg

Should only be flown

- 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.
- Well clear of any congested area of a city, town or settlement.
- At least 50 m clear of persons, vessels, vehicles or structures. This can be reduced to 30 m for take-off or landing. Other model operators and any assistants or officials may be within this distance; as may vessels, vehicles or structures under their control.

and

- **A serviceable 'fail-safe' mechanism should be incorporated** to operate on loss of signal or detection of an interfering signal. For example on an internal combustion power driven model this should operate, as a minimum, to reduce the engine(s) speed to idle.
- Ensure that any load carried on the model is secure.

3 Air Traffic Control and Controlled Airspace

Before flying within controlled airspace or an ATZ

- Obtain permission from the appropriate air traffic control unit.

Chapter 6 Flying Radio Controlled Models

1 General

Always fly with regard to the general regulations concerning radio control (R/C) flying covered in Chapters 2 and 5.

Models should be checked thoroughly prior to each flying session and after any abnormally hard landing.

Metal propellers must not be used on internal combustion engines or electric motors.

All R/C models are subject to in-flight vibration, landing knocks, transport damage etc. Take care 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.

It is recommended that you use welded or soldered re-chargeable battery packs in your radio control equipment. Dry batteries may be adequate for use in transmitters but their use in airborne battery packs is not recommended.

With new or repaired radio control equipment, a ground range check should be performed, preferably with the equipment installed in a model. The ground range check should be carried out in accordance with the manufacturer's instructions, taking care to look at the minimum distance (for the majority of 35 MHz transmitters the minimum distance is around 50 metres with the transmitter aerial down). Make sure that the model's controls are still functioning correctly with no 'jittering'.

It is also good practice to carry out a ground range check on your radio equipment at regular intervals, at least every few months, and a check is advisable if the equipment has not been used for a month or two.

When starting an engine, make sure that the model is restrained and cannot move forward.

When preparing for a 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.

Immediately before take-off, flight controls should be checked again for full, free and correct movement under full power if applicable. If there are any doubts as to their operation, do not fly.

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.

Maintain a clear view of the model and allow plenty of room between the flight path and spectators, other flyers or model 'pit' areas. Avoid flying between yourself and spectator or 'pit' areas, especially when landing.

Be aware of the sun's position in relation to you and the model. Flying "through the sun" can cause temporary blindness and the loss of control of the model. The use of sunglasses is recommended – remember never look directly at the sun.

Avoid low overflight of houses, domestic gardens, car parks, traffic or spectators. You have no control over people walking by at a reasonable distance from your take-off/landing area but you should take care not to overfly them at low level.

At any sign of malfunction or an unexpected loss of models parts, land as soon as it is safe to do so.

When you decide to land, never assume that the landing area is clear. Always look and be prepared to land in a safe place away from your planned landing area if necessary. In all cases, the safety of people is paramount.

1.1 Pre Flying Session Checks

On arrival at the flying site, think S.W.E.E.T.S:

S Sun
 W Wind
 E Eventualities
 E Emergencies
 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 aeroplane 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?

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 do you 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?

Then **CHECK**:

- the airframe for any transit damage;
- that servos and linkages are secure;
- the undercarriage for secure fixing and correct alignment; and
- the propeller for damage and secure fixing.

1.2 Check before each Flight

- a) If frequency control is in operation, obtain clearance to transmit.
- b) Switch transmitter **ON**, confirm correct model is selected, then receiver **ON**. Check that all controls operate freely and in the correct sense. Check that all control surfaces are in their correct positions with the transmitter trims at neutral.
- c) Look for any minor radio malfunctions such as slow or 'jittery' servos, glitches, etc. If in doubt, do not fly.
- d)
 - i) With Internal Combustion (IC) models: after starting the engine and allowing it to warm up, check that the pick-up from idle to full power is satisfactory. Hold the model with its nose pointing upwards at a steep climbing angle for ten or fifteen seconds and check engine operation at full power. If the engine falters or cuts it is usually set to lean and must be re-tuned. Repeat the test until the engine runs correctly in the nose-up attitude; or
 - ii) With electric models:
 - 1 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.
 - 2 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 the flight battery, 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.
 - 3 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.
- e) Control Checks. Finally, with the aircraft held securely (usually on the ground for IC models), 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**.
- f) Double Check that all transmitter trims, rate switches, mixers etc. are in their correct positions and that the transmitter meter is 'in the green'.

1.3 Before Flying

Be S.M.A.R.T. with your transmitter
S witch on
M eter in the green / M odel selection correct
A erial secure and extended
R ate switches in all correct positions
T rim all in correct positions

1.4 Checks after each Flight

- Receiver **OFF** then transmitter **OFF**.
- Clear the frequency control system if it is in operation.
- Check propeller, airframe, undercarriage, wing fixing etc. for security of fastening and for possible flight or landing damage.
- Remember – avoid flying with a damaged aircraft or propeller, or with any possible radio problem.

2 Radio Controlled Helicopters

Only fly with regard to the general regulations concerning radio control flying covered in Chapters 2 and 5.

Take care to use sites which are of suitable size in relation to the type of manoeuvres to be flown by the model.

Only fly after you have ensured that any spectators are well clear of the intended flight path of the model.

Rotor blades should be carefully balanced before use.

For IC powered helicopters:

- When starting the model in the pits, hold the rotor head firmly. When the engine is running carry the model a sensible distance from other people before running up or flying.
- Do not release the rotor of the model until you are sure that it is safe to do so.
- Never hold the model overhead to run up the engine or run the engine with no rotor blades fitted.

For electric powered helicopters:

- Electric helicopters should be carried out from the pits area with the flight battery disconnected and it should only be connected in a safe area. The model **MUST** be considered to be live as soon as this is done and great care is needed during this procedure.

2.1 A Model Helicopter Must Not be Flown or Run up:

- In or near the 'pits' area or close to any spectators.
- Directly towards the pits area or any spectators.
- With metal rotor blades.
- With knife-sharp leading edges on main or tail rotors.
- With damaged or out of balance rotor blades. Note that blades, especially wooden ones, should be reinforced at the root with hardwood, glass-fibre or some other suitable material.
- With radio equipment unproofed against shock and vibration.

2.2 Checks Before a Flying Session

- Check all ball links for slop and change as necessary.
- Check that all rotor blades are in good condition with no damage apart from minor tip damage.
- Check for loose or missing nuts and bolts.
- Check that there is no backlash in the drive system apart from gear backlash which should not be excessive.
- Check that servos are secure and free from contamination.
- On IC models, check that the fuel tank and all piping is secure.
- On electric models, check that the flight battery and associated wiring is secure.
- Check that the receiver aerial is secure and in good condition with no chafing or damage.

2.3 Checks before each Flight

- If a helicopter suffers damage or a heavy landing, re-do all the pre-flying session checks.
- Check all controls before starting, especially for binding links or slowing of servos.
- Check that the receiver aerial cannot become entangled with any moving or rotating part.
- Re-check controls at high rotor rpm just before lift-off. At the same time check main rotor blades for true tracking (the rotor disk should be clear and steady). Any excessive vibration should be eliminated before flight.
- Double check that all switches on the transmitter are in their correct positions before **EVERY** flight.

3 Gas Turbine Powered Models

The operation of gas turbine engines requires special care and the manufacturer's operating instructions must be understood and closely followed. All pilots and helpers must be fully briefed on the operation of the engine before any starts are attempted.

Never run an engine in excess of the manufacturer's recommended power rating. Always follow the manufacturer's recommendations on pipe work and fittings, especially with regard to periodic renewal.

Take extra care during the engine's initial operating period. Until the unit is proven, do not operate it near people.

Pressurised gas fuels, such as propane, require care in handling; spill dispersal rates can be slow and the gas can 'pool' in hollows or in void areas in fuselages. The liquid can also cause frostbite, if allowed to come into contact with skin.

Ensure that all fuel is stored in labelled containers fit for the purpose. These containers should be no larger than necessary.

All gas turbine models should be fitted with a failsafe. This must, as a minimum, bring the engine to idle in the event of radio interference or failure. The fuel system must be capable of manual shut-off via a fuel valve or fuel pump switch.

3.1 **Before Starting:**

Smoking or naked flames must not be allowed near the engine and the fuelling area. A suitable fire extinguisher (CO₂, dry powder but not water) should always be present at start-up and for any period during which the engine is running.

The start-up area should be kept clean and free from any loose items that may get sucked into the fan or turbine.

Ideally the start-up area should be on a paved surface, but if this is not possible the grass should be short and clear of all loose material.

Check the integrity of any compressed air hoses, clips etc., prior to turning on the air. Manufacturers' instructions should always be followed, particularly those relating to safety.

Gas fuelled models must never be left in the pits area fuelled up. Once fuelled up they should be moved directly to the designated start-up area.

3.2 **Starting:**

Gas turbines should normally be started facing into wind; however, ensure that the jet tailpipe is never pointed at people or the pits area. The effect of the jet blast must always be kept to the absolute minimum.

Beware of the possibility of "wet" starts with liquid fuels.

Whenever possible a reliable helper should assist with the start. The helper should be close by and fully briefed on the operation of the engine. The helper should ensure that you are not distracted during the start sequence.

Models must be physically restrained during start-up. The use of wheel brakes alone is not sufficient.

3.3 **Shutdown:**

After every flight ensure that the engine is fully shut down, that the fuel shut-off has been operated and that any hatches are opened to assist with engine cooling.

3.4 **General Safety Information:**

Adverse runway conditions can have an adverse effect on the aircraft's performance on take-off. e.g. wet or long grass will significantly increase take-off distance.

The rate of climb at take-off weight may be significantly less than that of a propeller driven model aircraft. Care must be exercised to ensure safe clearance of any obstacles immediately after take-off.

The lack of "prop wash" over the control surfaces of a jet propelled model aircraft will result in less control surface effect, particularly at low speed.

4 **Radio Controlled Silent Flight (Gliders and Electric Powered Models)**

Flying radio-controlled gliders and electrically powered models (see also paragraph 5) are essentially safe and environmentally acceptable pastimes provided a few basic safety precautions are taken.

Passers-by and others who may be watching the flying, particularly at slope soaring sites, tend to be unaware of the presence of gliders because gliders do not have engines or propellers and so do not make a noise. The pilot must therefore exercise even greater caution and awareness when flying on sites where the public are likely to be present.

If learning to fly, the best possible advice is to seek the help of members of your local club. The shop where you bought the model or radio will usually help to put you in contact with such a club. The BMFA and other specialist aeromodelling associations will also be happy to advise.

(See **Annex A** for addresses.)

Before you even buy a model, local club members will be happy to advise on the best type of model to build and fly. They can advise on finishing the model, installing the radio and, most importantly, they can 'trim' the model for you so that it will fly safely. For gliders with a mass in excess of 20 kg, see **Chapter 3**.

4.1 **Launching the Glider**

- **When using a towline, winch or bungee to fly from a flat field, always ensure that no other model is endangered** by checking above and behind before releasing the model. Models landing always have priority over models launching.
- Aerotowing the glider requires careful handling of both the tug and the glider. Remember that to fly **ANY** model over 7 kg above 400 feet requires a permission. Your local club may already have such a permission.
- **Ensure that any spectators are standing behind the launch point** so that if the model veers to either side, the spectators are not at risk.
- **When setting out the bungee, winch or towline**, make sure that, when it disengages from the model, it will not fall across powerlines, or adjacent roads or pathways where passing vehicles or pedestrians could become entangled.
- **Check the proper operation of the radio and the movable surfaces of the model before any launch.** A previous hard landing may have caused some unseen damage. Such a check will safeguard your model and will also minimise the risk to bystanders, nearby property and vehicles.

IF IN DOUBT, DO NOT FLY.

4.2 **Flying the Glider**

- **When learning to fly, try to keep the model upwind** and leave yourself with plenty of altitude to make a proper landing approach.
- **Avoid flying the model directly into or across the sun;** the glare may cause you to lose sight of the model and effective control may be lost. Good sunglasses can minimise this problem and also protect your eyes.
- **Do not let the model fly too far downwind.** The smaller the model appears, the more difficult it is to fly and orientation becomes more of a problem. Know the limitations of your eyesight and always fly within 'easy' visual range.

4.3 **Landing the Glider**

- **Before launching, select your landing area.** This should be free of obstructions on the approach, which should always be into wind so as to reduce the speed of the model over the ground.
- **If possible, avoid overflying other pilots' transmitters** as this may cause radio interference.
- **Try to stay away from trees, buildings and other structures** which may cause turbulence, making the model difficult to control.
- **Be particularly vigilant for bystanders – especially children** – who may be unaware of the presence of the model as it lands.

5 Electroflight

5.1 For electrically powered models, all the safe operating conditions described in **paragraph 1** apply. In addition:

- When fast charging Ni-Cad or Ni-MH batteries, use a battery charger equipped with either a timer or a voltage or temperature controlled cut-off. Overcharging Ni-Cad or Ni-MH batteries at high currents can be dangerous.
- Lithium Polymer (Li-po) batteries are also extremely susceptible to both overcharging and over discharging. A charger designed specifically for charging Li-po batteries must be used. Care should be taken to ensure that the batteries are not discharged at current rates that are outside the manufacturer's recommendations as to do so can be dangerous.
- Check carefully that motor operation does not interfere with the R/C equipment in the model. A range check with motor on and off should be carried out with all new installations. If in doubt, do not fly.
- Current flows in the battery-controller-motor setup of electroflight models can be extremely high. Make sure that all cables and connectors are in good order and are robust enough to perform without significant overheating.
- Take great care when handling any electroflight model that has its batteries fitted. The power and torque of electric motors can be very high and contact between a turning propeller and any obstruction will not stop the motor, but will just make it try to turn harder.

6 Seaplanes

6.1 General

The classification 'Aeroplane (Seaplane)' includes floatplanes and flying boats, both sometimes called waterplanes. The advice here also applies to amphibians when operating on water.

There are fewer suitable sites for seaplanes than landplanes in the UK and generally sites are also more restricted. The number of spectators is also much smaller. These factors are taken into account before suggesting the following modified safety considerations for seaplanes.

6.2 Seaplanes having a mass of up to 7 kg:

NO difference from landplanes of the same mass.

6.3 Seaplanes having a mass of over 7 kg and up to 20 kg:

Where conditions allow, and provided the model is flown along the line of the crowd or away from them:

- A minimum of 50 m separation should be maintained between the model in flight and the people who are not involved in the operation of the model.
- This distance may be reduced to 20 m for take-off or landing.
- A distance of 10 m should be maintained while the model is taxiing. Taxiing towards the crowd should be minimised.
- All other requirements are the same as for landplanes.

7 First Person View (FPV) Radio Control (R/C)

7.1 What is FPV R/C?

FPV R/C is a system whereby a radio control model aircraft is piloted by using a live video downlink from an on-board camera allowing the pilot to experience a 'cockpit view' and to control the aircraft from the visual perspective of that camera. The live video is normally displayed to the pilot through 'video goggles' worn on the pilot's head or through a stand-alone monitor.

7.2 Legal Position

The law requires that the person in charge of a model aircraft must maintain direct unaided visual contact with the aircraft sufficient to monitor its flight path so that collisions may be avoided. This is obviously not possible if the person in charge is wearing goggles or is otherwise constantly monitoring a display. Therefore there needs to be a way to facilitate this and to address other safety concerns.

7.3 Safety Concerns

Images captured by a camera and displayed on a flat screen afford the pilot little by way of depth perception and no peripheral vision. This can make it difficult for the pilot to accurately judge speed and distance and to maintain sufficient awareness of the area surrounding the aircraft to effectively 'see and avoid' obstacles and other aircraft. The ability to control the aircraft and avoid collisions is also greatly affected by the quality of the video being displayed. Furthermore, in the event of a loss of the video data stream, which can easily occur if the aircraft is flown beyond the range of the video transmitter, the pilot is likely to experience difficulty in locating the aircraft relative to his own position and visually acquiring it before loss of control occurs.

7.4 Control Measures

The mechanism to address the safety concerns and to overcome the visual contact problem is already in place within R/C flying. This is the Buddy Box system which is regularly employed to train ab-initio pilots. In an FPV R/C scenario it enables the person in charge of the model to hold the master transmitter and maintain direct unaided visual contact with the model whilst another person flies the model by reference to the live video from the on-board camera. In the event of an emergency or problem the person in charge with the master transmitter must take control of the aircraft and take whatever action necessary to maintain safety.

7.5 In addition to the guidance already contained in paragraph 1 of this Chapter, consideration should be given to the following:

- a) **Pre-Flight Checks.** Ensure that the additional transmitters (data/video) are switched on whilst conducting the range check.
- b) **Battery Charge Status.** FPV can involve several more batteries than normal R/C flight. All batteries should be checked for full charge before each flight.
- c) **Training.** FPV flying means that the pilot controls the aircraft by reference to the horizon – just as with full-sized aviation. Before attempting a first flight it is a good idea for a novice FPV pilot to wear the goggles and view the video feed as a "passenger" whilst another pilot flies the aircraft.
- d) **Positional Awareness.** FPV flying differs from line-of-sight flying in that the pilot sees a completely different perspective and, during his first flights, it is easy to lose track of where the aircraft is relative to the flying field – especially when directly above it.

- e) **Interference.** Interference from WiFi installations can create horizontal lines on the pilot's video image if using analogue 2.4 GHz video equipment. This is another good reason why pilots should ensure that their flying field is away from residential areas. See also Chapter 8.

7.6 **Only fly if:**

- 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.

These operating conditions very clearly place the legal responsibility for the safety of the flight on the person in charge who must maintain direct unaided visual contact with the model at all times.

Chapter 7 Other Models

1 Free Flight Models

1.1 Only Fly:

- On sites that are clear and open with adequate open space downwind of the launch point. (With a strong wind this distance could be considerable.)
- In good visibility.
- After you have ensured that any spectators are clear of the intended initial flight path of the model.
- With due consideration for other people and property.

2 Control Line Models

Only fly on sites that are **WELL CLEAR OF ANY OVERHEAD CABLES**. Even low level electrical cables on wooden poles carry **LETHAL** voltages. **KEEP CLEAR!**

Take care that the site you choose is clear and open and of a size suitable for the flying of control line models.

Do not fly until you have ensured that any spectators are well clear of the intended flight path of the model.

Before each flying session check that all controls, control lines, linkages etc. are in good condition and safe to use.

Before each flight, re-check control lines for damage.

If someone strays into the circle while you are flying, fly high to avoid them and stay high until the circle has been cleared.

3 Rockets

NOTE: Article 137 of the ANO 2009 (Endangering Safety of an Aircraft) applies to all rockets: the operator of a model rocket must ensure that it does not endanger a real aircraft.

3.1 General

Only fly on sites that are clear and open with adequate open space downwind of the launch point and in good visibility.

No person shall launch a rocket unless he has reasonably satisfied himself that:

- the flight can be safely made; and
- the airspace within which the flight will take place is, and will throughout the flight remain, clear of any obstructions including any aircraft in flight.

Models should be constructed of lightweight materials capable of meeting the minimal structural loads expected during flight. The use of metal components should be limited to the absolute minimum necessary to ensure the integrity of the rocket during flight and recovery.

Models should, for the most part, use commercially available factory-produced motors. Models powered by non-commercial motors must follow the United Kingdom Rocket Association (UKRA) approved safety code. Only motors that are compliant with all relevant UK legal requirements shall be used. For further information contact either the BMFA or the UKRA.

Models should be equipped with a suitable recovery system to ensure a safely retarded descent.

Motors should be ignited electrically in such a way that the operator is at least five metres from the launch point.

3.2 **Rockets between 160 Newton-seconds ('G' Rating) and 10,240 Newton-seconds ('M' Rating)**

In addition to the above, article 168 of the ANO 2009 (Rockets) applies to all rockets with motive power exceeding 160 Newton-seconds ('G' Rating) and the requirements of the article are summarised below:

No person shall launch a rocket with a motive power that exceeds 160 Newton-seconds ('G' rating) unless he has reasonably satisfied himself that:

- the flight can be safely made; and
- the airspace within which the flight will take place is, and will throughout the flight remain, clear of any obstructions including any aircraft in flight;

and unless:

- for a flight within controlled airspace, he has obtained the permission of the appropriate air traffic control unit for aircraft flying in that airspace;
- for a flight within an ATZ he has obtained the permission of the air traffic control unit, the aerodrome flight information service unit at the aerodrome or the air/ground communications service unit as appropriate; and
- for a flight for aerial work purposes the flight is carried out under and in accordance with a permission granted by the CAA.

3.3 **Rockets over 10,240 Newton-seconds ('M' Rating)**

Large rockets exceeding 10,240 Newton-seconds must not be launched unless in accordance with a permission granted by the CAA. Further details can be obtained from the Airspace Utilisation Section of the CAA (see Annex A for contact details).

Chapter 8 Control Frequencies

Radio usage for business, broadcasting and leisure activities continues to expand rapidly. The use of radio is carefully planned on an international basis to give as high a standard of service as possible. Unauthorised use of radio can cause harmful interference to legitimate users and/or put safety of life at risk.

It is therefore important that operators of model aircraft use the allocated frequencies and comply with the applicable technical restrictions.

OFCOM is the regulator for the UK communications industries, with responsibilities across television, radio, telecommunications and wireless communications services. Amongst its other responsibilities, OFCOM takes action to prevent interference and any risk to safety of life.

A summary of the frequencies allocated for model control is listed below. This information should be read in conjunction with OFCOM's document OfW 311 (available from www.ofcom.org.uk) on Radio Control Models which gives a comprehensive list of frequency allocations and technical restrictions that apply.

Frequency	Use	Effective radiated power (milliwatts)	Comments
26.96 to 27.28 MHz	General	100	Also used for Citizen Band radio as well as low-power telemetry
34.945 to 35.305 MHz	Air	100	36 channels with a 10 kHz channel spacing
40.66 to 41.00 MHz	Surface	100	34 channels with a 10 kHz channel spacing
458.5 to 459.5 MHz	General	100	Telemetry & Telecommand
2.4 to 2.4835 GHz	General	100	Telemetry & Telecommand

Modellers should always think carefully about the possibility of interference and ensure the equipment they propose to use is suitable and operating in a frequency band appropriate for the intended use.

INTENTIONALLY LEFT BLANK

Chapter 9 Model Flying Sites – Models Over 7 kg

Model Flying Sites for Models over 7 kg

The operator of a model having a mass of over 7 kg is required to obtain permission before flying his model within controlled airspace or within an active ATZ.

Try to fly at a site which is already cleared for use by models rather than trying to obtain individual permission. The model associations are listed in **Annex A** and should be able to advise you of local sites.

For advice on whether there is controlled airspace in a particular part of the country, check with the appropriate airspace utilisation number given in **Annex A**.

Flight within an ATZ can be cleared by the relevant Air Traffic Control unit. Telephone numbers are in local telephone directories.

It is far better to establish a model flying site with long term permission, rather than seek one-off permission. A written permission for the use of a site may have conditions, such as a height limit and times of use. There may also be a requirement to notify ATC when the site is actually being used. There are many sites already established on this principle.

Direct liaison with the controlling authority or the aerodrome operator is needed to arrange this type of permission. However, if there are difficulties with the terms of such permission, or if permission is refused, arbitration by the CAA may be possible. The Flight Operations Inspectorate (General Aviation) or the Air Traffic Standards Department may be contacted for advice in the first instance.

INTENTIONALLY LEFT BLANK

Chapter 10 Electricity Board Guidelines

There are over half a million kilometres of overhead electric power lines in the mainland of Britain. Most are uninsulated and carry up to 400,000 volts along conductors supported on wood and other poles, and on metal towers (pylons).

The safest way to avoid contact with overhead electric power lines is not to fly under or near them. Always observe the following precautions – your life may depend on it.

If a model is tangled in electricity wires, stay clear and call for expert help.

If wires are damaged by a model:

- **Stay clear and call the electricity supply authority.**
- Even small wires can carry lethal voltages and these can extend into the ground around the end of a broken line – sometimes up to several metres.
- Never try to 'rescue' a model with a wooden pole or other 'non conductor' – under some weather conditions, many materials will conduct high voltage electricity.

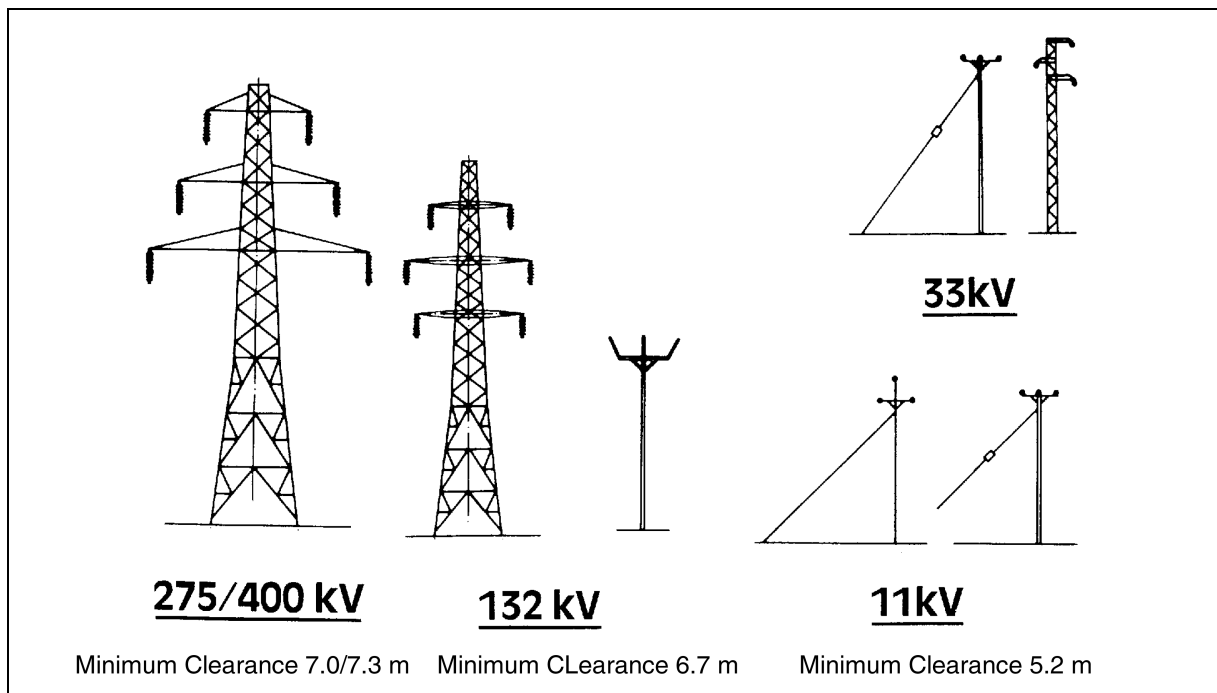


Figure 1 Typical Overhead Line Supports
With minimum clearances of lines from ground

INTENTIONALLY LEFT BLANK

Chapter 11 Military Low Flying

Military low flying training takes place virtually anywhere in the UK outside of controlled airspace and away from major towns and cities.

Low Level Civil Aviation Notification Procedures (CANP) may be of help.

On a **WEEKDAY**, CANP lets you tell the military where and when you intend to fly.

CANP CAN BE USED IF A MODEL FLYING SITE IS PLANNED TO HAVE FIVE OR MORE MODELS FLYING AT ONE TIME AND IF MILITARY LOW FLYING IS KNOWN TO TAKE PLACE IN THE AREA:

You can notify the Tactical Booking Cell of London Air Traffic Control Centre (Military) weekdays on:

Freephone 0800 515544 or Fax 0800 3892225 or e-mail cas-gmbaslfosfbc@wittering.raf.mod.uk and give the following information:

	CIVIL LOW FLYING – RECREATIONAL ACTIVITY:
A	Model aircraft flying
B	Location – as Ordnance Survey grid reference + nearest village/town
C	Operating area, e.g. – 500 m radius
D	Date and start/finish in local time
E	Operating heights – lower/upper limits agl
F	Number (+ type) of models, e.g. – three gliders and three aeroplanes
G	Contact telephone number
H	Operator or Club name + phone if different to G

If possible, call the day before the planned activity. A minimum of four hours' notice is required to allow the information to be circulated to military flying units.

INTENTIONALLY LEFT BLANK

Chapter 12 Model Displays

1 General

This section provides general guidance for planning and organising a model flying display. As the size and nature of such events varies considerably it is only possible to incorporate in this publication general pointers in terms of safety and control. It is recommended that groups contemplating holding a model flying display should also refer to the handbooks that are published by the BMFA, the Scottish Aeromodellers Association and, for events where models having a mass of over 20 kg are to be flown, the LMA. Addresses of these organisations can be found in **Annex A**.

It is essential that any organiser contemplating holding a model flying display appoint the following:

A Flying Display Director, who is the person responsible for the safe conduct of the flying display and who will assume overall responsibility for the planning, organisation and subsequent running of the event.

A Flight Line Director who will assist in the planning of the flying and the briefing of the pilots, and who will take full control of all flying activities.

A Flight Line Marshal who is responsible to the Flight Line Director, and will directly control the active model flying.

A Police and Emergency Services Liaison Officer who is responsible for all contact with police and emergency services both before and during the display.

2 Permissions

2.1 In Regulated Airspace

Flying displays involving models below 7 kg do not need permission but should not take place within regulated airspace without prior consultation with the relevant air traffic control unit. Consultation should be entered into as early as possible and not less than 28 days before the display.

Flying displays involving models above 7 kg need permission from the relevant air traffic control unit. Consultation should be entered into as early as possible and not less than 28 days before the display.

2.2 Outside Regulated Airspace

Flying displays involving models below 7 kg do not need permission.

Flying displays involving models over 7 kg whose maximum altitude is planned to exceed 400 feet above ground level need a permission from the CAA, Flight Operations Inspectorate (General Aviation).

3 Organisation

The organiser should:

- Determine whether the site permits the separation distances that will be required for the type(s) of model that are to be flown or, if not, whether the CAA will allow an exception to be made in this instance.

- Establish whether a CAA site exemption will be required for the display and if so apply for it at least 28 days in advance.
- If the event is to be on Ministry of Defence land, obtain permission from the Commanding Officer and apply for a licence from the appropriate Defence Land Agency office.
- Ensure that arrangements are made for:
 - spectator control or, in the case of an event at which model flying is part of a larger function, the siting of the model flying area in relation to spectator enclosures, car parks etc.
 - Verification of the competence of all pilots taking part in the display.
 - Effective transmitter control and frequency monitoring facilities in the case of radio control flying, including any out of hours flying at the display site.
 - Airworthiness and safety checking of all model aircraft and equipment to be used in the display.
 - Verification of third party public liability insurance covering individual flyers, any model flying clubs involved in the display and the display organiser.

NOTES 1: Radio Control flying displays should not take place within controlled airspace, including ATZs and Military Air Traffic Zones (MATZs), without prior consultation with the relevant air traffic control unit concerned. Such consultation should be sought as early as possible and not less than 28 days before the display.

2: At an organised event with on-site overnight accommodation the organiser is responsible for any 'out of hours' flying at the display site if this accommodation is occupied.

4 Flight Line Marshal

The Flight Line Marshal is responsible for the flight safety of the display and must exercise authority over all flying matters. He must not hesitate to discipline pilots if necessary and he has the final say on all matters pertaining to the airside operation of the flight line.

5 Police and Emergency Services Liaison Officer

The Police and Emergency Services Liaison Officer is responsible for all contact with the police and emergency services both before and during the display. Before the display they will liaise with the police and local authorities if required or, in the case where model flying is part of a larger function, provide written notification to the function organisers of any special requirements. He will act as the point of contact with emergency services during the display.

6 Radio Control Display Sites

A tarmac or mown grass surface area for take-off and landing of recommended minimum size 100 x 40 metres should be available, with the 100 metres direction substantially into wind.

It is recommended that safety zones should be established for a minimum of 150 metres both upwind and downwind of the take-off and landing area and that there should be no spectators, moving vehicles or other obstructions within these safety zones.

The site should be positioned so that flying may generally take place without car parks or spectator areas being overflown.

Spectators should be behind a barrier located parallel to the take-off and landing direction. They should be only on one side of the flying area for radio controlled aircraft. In no circumstances should take-off or landing be performed towards spectator or car park areas.

The distance of models in flight from spectators should not be less than 30 metres for models under 7 kg as shown in Figure 2. For models over 7 kg and for all gas turbine powered models the distance should be 50 metres but this distance may be reduced to 30 metres for take-off or landing only. The organiser should also consider the need to add an additional separation distance for models of exceptional dimensions, mass or performance.

When planning for competitions or events where the display height exceeds 400 ft, consideration should be given to increasing the separation distances from the crowd line.

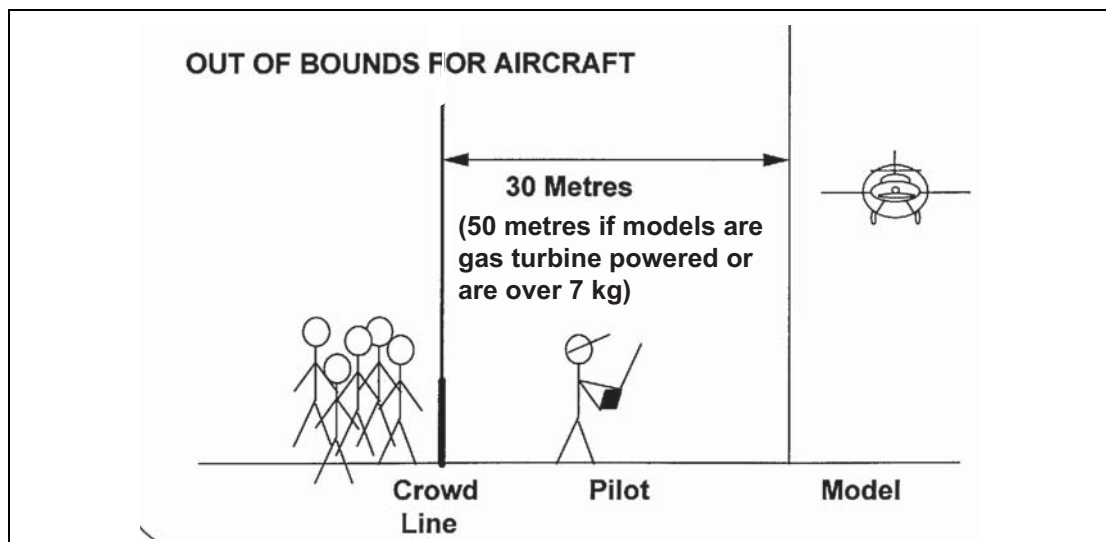


Figure 2 Arrangement of Display Site

7 Site Layout

The layout below (Figure 3) is a standard type which may have to be modified slightly depending upon site conditions and the number of spectators expected. Areas should be allocated for the flight lines, pits, start-up positions and pilot's box. Safety should always be the prime consideration. Indeed, if the site requires significant deviation from this, great care should be exercised in the acceptance of the site as suitable for a display event.

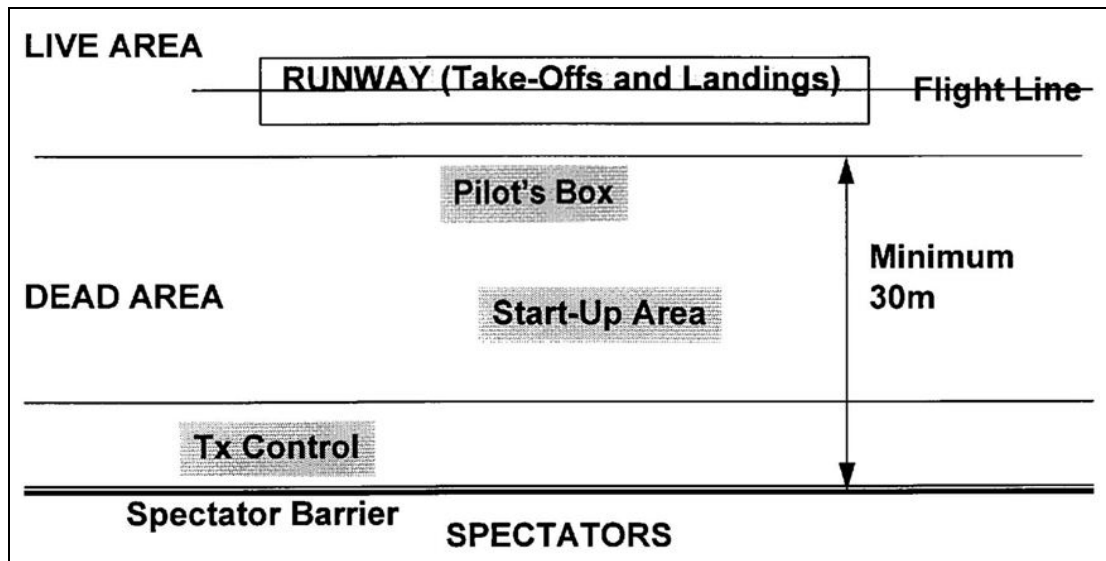


Figure 3 Typical Display Site Layout

8 Weather

Careful consideration should be given to how weather conditions on the day may affect the planned display, e.g. the effect of an on-crowd wind may be significant for larger models.

9 Control Line Display Sites

The flying area should be substantially flat. The aircraft are tethered and fly in a circular path; the minimum radius of the area required is the maximum control line length to be used in the display plus 15 metres.

A pilot's circle of approximately three metres diameter should be marked in the centre of the flying area (washable paint recommended) and pilots should ensure that they remain in this circle whilst flying.

UNDER NO CIRCUMSTANCES SHOULD THE BOUNDARY OF THE FLYING AREA BE LESS THAN 50 METRES FROM ANY OVERHEAD CABLES OR MASTS SUPPORTING SUCH CABLES.

Spectators should be behind stout rope barriers or similar restraints to isolate them from the flying area. Sufficient Marshals should be appointed to ensure that the spectators are appropriately controlled and supervised.

10 Ground Special Effects Safety

The use of explosives for simulated groundbursts, smoke and other special effects must be strictly controlled by a competent person appointed by the Event Organiser.

Debris from such effects must not impinge on aircraft, the spectators or the runway/taxiways and to this end the scale of any effects must be controlled and known before the event.

Briefings for ground officials and Display Pilots must draw attention to the hazardous nature of such devices and approval of all involved Display Pilots must be obtained before any demonstration goes ahead.

The location of the explosives and safety radii, if appropriate, are to be out of bounds to all staff except those directly involved with their operation.

Chapter 13 Occurrence Reporting

1 Definitions

An **ACCIDENT** is where a person suffers a fatal or serious injury as a result of contact with any part of any model including parts that have become detached from the model.

A **SERIOUS INCIDENT** means an incident involving circumstances indicating that an accident nearly occurred.

An **INCIDENT** is an occurrence that has the potential for an accident or serious incident to occur.

2 General Flying

In the event of an accident involving a model aircraft which causes injury to a third party, the pilot must inform their own National Association as soon as is reasonably practicable.

3 Public Events (Displays or Competitions)

The Organiser of a display is responsible for ensuring that any accidents involving injuries to members of the public are reported to the CAA as soon as is reasonably practicable. Note this includes injuries caused by ground special effects.

The Organiser of a display or competition is also responsible for reporting any accidents or serious incidents to their respective Association with information to the BMFA.

Incidents occurring near or behind the crowd line or in any area to which the public has access must also be reported to the respective Association as soon as is reasonably practicable.

The Flying Display Director shall be responsible for the initial determination of the seriousness of any incident occurring at the display.

The Display Organiser shall be responsible for initiating the reporting procedure outlined above.

At a display or competition, the Display Organiser must appoint a Police and Emergency Services Liaison Officer to act as the point of contact for liaison with the police and emergency services in the event of an accident or serious incident.

4 Contact Details

The respective Associations are to maintain a list of contacts who are authorised to act on behalf of their Association on notification of an accident or serious incident occurring.

Contact details can be found in Annex A "Useful Addresses and Telephone Numbers".

Accident reporting (Out of Office Hours) CAA: 07808 900327

INTENTIONALLY LEFT BLANK

Chapter 14 Aerial Work

To undertake aerial work all SUA and rockets require an ANO Permission from the CAA.

1 Aerial Work Defined

A flight is considered to be aerial work if it is undertaken for 'valuable consideration'.

2 Valuable Consideration Explained

Valuable consideration is defined as any gain you may make from the work undertaken.

In even simpler terms:

if, because of SUA flying, you are better off at the end of the day than when you started, you have probably been doing aerial work.

You may ignore any gain of nominal value – a pint of beer for instance, but a crate of the same is probably valuable consideration.

For more information regarding aerial work and UAVs, or for making an application for aerial work, please refer to the following documents:

- CAP 722 *Unmanned Aircraft System Operations in UK Airspace – Guidance*
(Available via www.caa.co.uk/cap722.)
- UK CAA Policy for Light UAV Systems
(Available via the CAA website www.caa.co.uk.)

INTENTIONALLY LEFT BLANK

Annex A Useful Addresses and Telephone Numbers

Civil Aviation Authority

Flight Operations Inspectorate (General Aviation)

Tel: +44 (0)1293 573525

E-mail: GA@caa.co.uk

Airworthiness Division

Tel: +44 (0)1293 573306

E-mail: Department.Certification@caa.co.uk

Air Traffic Standards Department

Tel: +44 (0)1293 573032

E-mail: ats.enquiries@caa.co.uk

Safety Regulation Group

Aviation House

Gatwick Airport South

West Sussex

RH6 0YR

www.caa.co.uk

Airspace Utilisation Section

Directorate of Airspace Policy

K102 CAA House

45-59 Kingsway

London

WC2B 6TE

Tel: +44 (0)207 453 6599

E-mail: ausops@caa.co.uk

British Association of Radio Control Soarers (BARCS)

16 Worcester Avenue

Kings Hill

West Malling

Kent

ME19 4FL

www.barcs.co.uk

Tel: +44 (0)1732 874900

E-mail: admin@barcs.co.uk

British Model Flying Association (BMFA)

Chacksfield House

31 St Andrews Road

Leicester

LE2 8RE

www.bmfa.org

Tel: +44 (0)116 2440028

Fax: +44 (0)116 2440645

Out of office hours (answerphone)

+44 (0)116 2440028

E-mail: admin@bmfa.org

Large Model Association (LMA)

LMA Secretary

Chapel Cottage

Tunley

Bath

BA2 0DP

www.largemodelassociation.com

Tel: +44 (0)1761 479396

+44 (0)7791 278292

E-mail:

secretary@LargeModelAssociation.com

Scottish Aeromodellers Association (SAA)

PO Box 1621
Johnstone
Renfrewshire
PA9 1YN
www.saaweb.org.uk

Tel: +44 (0)1505 681670 (day)
+44 (0)1505 706300 (eve & weekends)
+44 (0)7956 203222 EMERGENCY USE
Fax: +44 (0)1505 706500
E-mail: Secretary@saaweb.org.uk

United Kingdom Rocketry Association (UKRA)

27-29 South Lambeth Road
London
SW8 1SZ
www.ukra.org.uk

Annex B Relevant Legislation

Model aircraft are exempt from most of the rules, or articles, of the Air Navigation Order which contains the statutory requirements for the operation of aircraft in United Kingdom airspace.

Article 253 specifies exemption from the Order, except for the following articles:

- **Article 131** Aircraft must not be used for agricultural aerial application (crop spraying) unless the operator has an Aerial Application Certificate issued by the CAA.
- **Article 138** Endangering persons or property with an aircraft. See Chapter 2.
- **Article 161** The Secretary of State has the right to prohibit, restrict or impose conditions on flight.
- **Article 163** Rules for balloons.
- **Article 164** Rules for gliders, kites and parascending parachutes
- **Article 165** Rules for airships.
- **Article 166** Rules for flying Small Unmanned Aircraft (including model aircraft); see Chapter 5.
- **Article 167** Rules for flying model rockets; see Chapter 7, paragraph 3.
- **Article 232 except 232(2)(a)** Authority power to prevent aircraft flying.
- **Article 255** Definitions.

Article 168 specifies the rules for rockets.

INTENTIONALLY LEFT BLANK

Annex C Forms

Model Aircraft Exemption – Application
See www.caa.co.uk/srg1307

Over 20 kg

Model Aircraft Exemption – Application
See www.caa.co.uk/srg1308

Displays/Competitions

INTENTIONALLY LEFT BLANK