LARGE MODEL ASSOCIATION

MEMBERS' HANDBOOK

December 2025

Enquiries and Amendments

Any query or suggestion for amendment of this document should be addressed to the Company Secretary at secretary@largemodelassociation.com.

The names, addresses, telephone numbers and email addresses of Officers and Directors may be found on the LMA website.

Large Model Association is a trading name of Large Model Aircraft Association Limited, a company registered in England with company number 11711983
Registered Office Buckminster Lodge, Sewstern, Grantham, NG33 5RW

Disclaimer

While every care has been taken in the writing of this Handbook the Association or its Directors cannot accept responsibility whatsoever for any loss or damage that may occur as a result of information or advice which it contains.

Large Model Association Handbook

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1.1 Introduction

The Large Model Association was founded in 1982 to represent the point of view of those who build and fly large models to the Civil Aviation Authority and other bodies.

In 2018 the Annual General Meeting of the LMA voted to change the LMA from an unincorporated association to a company limited by guarantee. As of 1 January 2019, all members and assets of the LMA were transferred to the Large Model Association Limited with the working name of the Large Model Association.

In November 2024 the LMA became an Associate Body of the BMFA. All members of the LMA who actively fly model aircraft or participate in the running of the LMA must also be members of the BMFA or SAA.

The LMA is a non-competitive organisation and does not want to create an elite or unnecessary bureaucracy among large model flyers. The LMA works to address issues that may cause restrictions to large model flying, therefore we are concerned about safety and competence in building and flying large models.

The LMA, on behalf of all UK modellers, administers the inspection Scheme required by the CAA to legally operate models over 25 Kg.

The LMA website at www.largemodelassociation.com provides up-to-date information on the latest events and developments pertinent to large models.

Much of the LMA's time and resources are taken up in working with government bodies and other organisations in order to safeguard your model flying interests. The LMA also spends much time promoting and encouraging all facets of large model flying.

The LMA is a non-profit company and has one part time member of staff. All directors and officers are unpaid volunteers.

Throughout the year events are organised around the country-

- Public shows are both for the enjoyment of members and the promotion of modelling to the general public.
- Flyins are generally for the benefit of members, and give a relaxing break for flying in like-minded company.

1.1.1 Organisation and Aims

The LMAA Ltd is controlled by its Annual General Meeting and it is administered by a Board of Directors elected from its members. An Advisory Committee elected from those with long experience of the aims and traditions of the Association assist the Board of Directors in maintaining these aims and traditions.

The aims of the LMA are as follows:-

a) to unite modellers dedicated to the building, safe flying and enjoyment of large model aircraft and to organise events at which Members may fly such aircraft;

b) to assist those modellers in the design, building and safe flying of large model aircraft;

c) to encourage safety in the design, construction and operation of large model aircraft;

d) to liaise with and to represent Members interests to the British Model Flying Association and the Civil Aviation Authority and to such other bodies as the Board believes it would be in the interest of the Members to liaise with;

e) to offer the services of the Company to other groups, clubs and bodies in connection with the organisation of meetings and events involving the flying or display of large model aircraft;

f) through the Board to compile and maintain a set of rules and regulations by which Membership of the Company shall be governed (as well as by Articles of Association) and which Members shall abide by.

This handbook provides the rules of the LMA and guidelines on how to legally, appropriately and successfully fly large model aircraft.

The full rules covering membership and the running of the LMA can be found in the LMAA Ltd Articles of Association, available for download from the LMA website.

1.2 Membership

1.2.1 Application for Membership

Membership is available to all applicants who agree to abide by the aims and rules of the Association.

Note: In exceptional circumstances, the LMA Board reserves the right to refuse membership applications.

All LMA members who actively fly model aircraft or participate in the running of the LMA must also be BMFA or SAA members.

1.2.2 Membership Fees

Applications for membership part way through the year may be subject to a reduced membership fee as decided from time to time by the LMA Board. The membership fees and any joining fees are set each year by the LMA Board and ratified at the AGM.

1.2.3 Membership Period and Renewals

The normal period of membership is from 1st January to 31st December in each year. Membership must be renewed annually. Membership not renewed by the end of February lapses.

(Note- BMFA membership and the associated insurance cover lapses on December 31st. The period of grace allowed by the LMA to cover membership renewals does not extend to BMFA membership and insurance).

1.2.4 Rules of LMA Membership

The rules of the LMA consist of this handbook sections 1 and 2 and the company Articles of Association.

1.3 Meetings

1.3.1 General Meetings

These consist of the Annual General Meeting of the Association, normally held in November, plus any Extraordinary General Meetings which may be called from time to time to consider particular matters. A General Meeting will be called with at least twenty one days' notice.

1.3.2 Voting Rights at General Meetings

All LMA members have the right to vote at general meetings of the LMA. Each member shall have one vote. Every Member who is entitled to attend and vote at a General Meeting is entitled to appoint a proxy to attend, speak and vote on their behalf. Details of proxy voting arrangements will be given with the calling notice of a General Meeting.

1.4 Relationships With National And International Bodies

1.4.1 The British Model Flying Association (BMFA)

The LMA is an Associate Body of the British Model Flying Association (BMFA), and all active members of the LMA are required to also be members of the BMFA or SAA. The associate Body status allows insurance for the LMA and the activities of the LMA and its members to be provided by the BMFA and the registered company address of the LMA is also the registered address of the BMFA. The activities and approvals of the LMA remain separate from the activities and approvals of the BMFA.

1.4.2 The Scottish Aeromodellers Association (SAA)

Members in Scotland may use SAA membership as an alternative to BMFA membership to meet the requirements of the LMA Associate Body status and provide insurance.

There is no formal affiliation between the groups but the Association views that it is in its own interest to liaise with the BMFA where matters of common concern or mutual benefit arise.

1.4.3 The UK Radio Control Council

The Association is represented on this body together with the other modelling organisations. The Council serves to represent the member bodies' interests to the Radiocommunications Agency, the organisation responsible to the Department of Trade and Industry for management and control of radio-frequency transmissions and their specification, allocation of frequency bands etc.

1.4.4 The European Model Flying Union

The Association is represented on this body together with most of the other European national modelling organisations. Through the EMFU, the LMA is a member of Europe Air Sports, a body recognised by the European aviation regulator EASA.

1.4.5 The Civil Aviation Authority (CAA)

The LMA has formal links with the CAA who regulate all flying of manned and unmanned aircraft in the UK.

The Association plays a leading part in negotiations with the CAA about the definition and implementation of applicable regulations, and requires all members to follow these rules. A summary of the current regulations is given in Section 2.1.

The LMA holds an operating authorisation to allow members to fly model aircraft with the minimum of restriction, and oversees the construction and operation of model aircraft over 25kg.

1.5 Insurance

Third party indemnity insurance for model flying is provided as a benefit of membership of the BMFA or SAA. Full details of the cover provided will be provided with your BMFA / SAA membership.

1.5.1 Making A Claim

In the event of an accident or incident where a third party is involved, the BMFA or the SAA must be informed immediately.

A separate report to the LMA Secretary must be made in accordance with section 2.2.6 Occurrence Reporting.

2.1 Flying Legal Background

2021 has seen a significant change in the legal basis of flying model aircraft in the UK.

The Air Navigation order now refers to the Unmanned Aircraft System (UAS) regulations that apply to unmanned aircraft, which are based on the EASA rules for unmanned aircraft.

Summary versions of the regulations can be found at the CAA website:

- The UAS Implementing Regulation: CAP 1789A
- The UAS Delegated Regulation: CAP 1789B
- The 2020 amendment to the ANO: CAP 2013

The UAS Implementing Regulation regulates UAS flights based on the risk of the flight, and introduces 3 categories of operation for unmanned aircraft. Full details of these categories can be found in CAP 722.

- Open – The lowest risk category of operations with UAS under 25kg, no specific authorisations are necessary, and the limitations in the 3 sub-categories of operation in the Open category depend on the risk:
  - A1: 'Over' people
  - A2: 'Close' to people
  - A3: 'Far' from people – This is the sub-category in which 'traditional' model aircraft can fly in the Open category
- Specific – Operations that cannot be in the Open category and need to be authorised in accordance with a safety case, based on risk.
  - Model aircraft operations conducted under an Article 16 authorisation are in the Specific Category.
- Certified - The highest risk operations, where the UAS will be used for-
  - The transportation of people or the transportation of dangerous goods where there is a high level of risk to third parties,
  - Flight over assemblies of people with a UAS characteristic dimension of 3m or more,
  - Any other sufficiently high-risk operation.

The Certified category does not apply to any model aircraft and is mentioned here for information only.

Model aircraft under 25kg can be flown in the Open Category, but model aircraft over 25kg can only be flown in the Specific category.

2.2 Article 16 Operating Authorisation

To allow model flying to continue with as little change as possible, the LMA holds an Article 16 operational authorisation in the Specific Category, which gives LMA members rules and limits which are practically little different from how models have been flown in the past.

The full article 16 authorisation is available on the LMA website under Resources.

This handbook provides explanation and guidance on the Article 16 authorisation rules as they apply to you and how to reasonably meet them.

Appendix 1 gives the definitions of the terms used in this handbook and the Article 16 authorisation.

It is a condition of LMA membership, when first joining or renewing annually, that you confirm that if you fly a model aircraft under the LMA's operating authorisation that you have read, understood and will comply with the terms of the authorisation. If any specific guidance or clarification is needed, please contact the LMA Secretary.

It is not compulsory to fly under the LMA's article 16 authorisation, you can if you wish fly in the open category or using your own Specific category authorisation if you have one. If you choose to do this, the full rules you will need to follow are in CAP 722 and are different, especially the separation distances, the height limit and the classes of unmanned aircraft that can be flown with different separation distances.

You will still be covered by the BMFA insurance if flying non-commercially in the open category, but there is no mix & match of rules. You are either entirely following the open category rules in CAP722 or entirely following the LMA's Article 16 authorisation rules as described in this Handbook.

2.2.1 Model Aircraft Weight

Every weight given in the operating authorisation and this handbook refers to the Maximum Take Off Mass (MTOM) of the model aircraft. MTOM is the maximum weight of the aircraft when it is ready to fly with all fuel tanks full, smoke tanks full, batteries fitted and anything else that will be attached or in the model fitted.

All fuel tanks have some ullage (the air space at the top of the tank), so the positioning of the tank vent determines when fuel overflows and therefore how much can be put into the tank and so the ullage can be used to set the model's MTOM. If the fuel tank plumbing is changed, the model will need to be re-weighed to determine the new MTOM.

2.2.2 Roles and Responsibilities

To fly a model, there are two roles, the Operator and the Remote Pilot. In most cases, they will be the same person (an LMA member 18 or over will be both an operator and remote pilot of their own model aircraft), but they can be different people.

2.2.2.1 Remote Pilot

If you handle the controls of a model aircraft, you are the remote pilot.

There is no minimum age to be the remote pilot of any model aircraft under 25kg or over 25kg.

2.2.2.1.1 Remote Pilot Competency

To be a remote pilot, you must have demonstrated your competency, and competency in this case means a

theoretical knowledge of the applicable rules. There are several ways you can demonstrate your competency-

a) Passing one of the following online theory tests:

- CAA online DMARES test
- LMA Theoretical Proficiency online test

Any of these routes is the legal minimum required to fly, the requirements for flying at public or other events may be different.

You must be fit to fly, not drunk, on drugs, too tired and so on. Basically, if you are not fit to drive a car, you are not fit to fly.

2.2.2.1.2 Pilot Responsibilities

Your responsibilities as a remote pilot cover what you need to do before the flight and during the flight.

Responsibilities Before Flight

- Check for any airspace restrictions where you are about to fly (flight restriction zone, danger area etc.)
- Make sure the place you are about to fly from is suitable and will let you keep the minimum separation distances from other people
- Make sure that the model aircraft is in a condition that it can fly safely
- Make sure that, if necessary, information about your flying has been given to the relevant air traffic control, other airspace users or anyone else who may need to know.
- If you are flying an aircraft that comes as a complete and ready to fly system, you must be familiar with the manufacturer's instructions. It is also recommended to be familiar with the manufacturer's instructions of the significant components of your model aircraft (control system, power system)
- If you are flying at a display, it is your responsibility as pilot before you fly to ensure you have the necessary currency if needed (see section 5.2.7.1), that the necessary permission for the display is in place (see section 5.1) and that the necessary notifications (such as a NOTAM) for the display are in place
- If you are flying at a club site or a flyin where flight of aircraft over 7.5kg over 400ft is allowed, it is your responsibility as pilot before you fly to be sure that the necessary permission for the flight over 400ft is in place (see section 5.1) and that the necessary notifications (such as a NOTAM or AIP entry) for the site / event are in place

Responsibilities During flight

- Follow all the limitations and conditions in the LMA's operating authorisation and this Handbook
- Avoid any risk of collision with any manned aircraft and stop the flight as soon as possible (including ditching the aircraft if necessary) if there is a serious risk to other aircraft, people, animals, environment or property
- Comply with any applicable airspace restrictions (danger areas, flight restriction zones etc.)

- Do not fly close to or inside areas where an emergency response effort is ongoing unless you have permission to do so from the responsible emergency response services

The safety of every flight is your ultimate responsibility as the remote pilot and you may only fly the model aircraft if you are reasonably satisfied that the flight can be safely made.

No matter where you are flying, it is therefore your responsibility to make sure that you comply with all separation distances, height limits and other limitations.

2.2.2.2 Operator

Every member 18 or over who flies under the LMA's operating authorisation must register as an operator with the CAA. You can register either directly via the CAA, through the LMA or with another model association, but you only need to register once per year, and the registration is renewed annually with a fee to be paid to the CAA.

As the minimum age for a UAS Operator is 18 years old, if you are under 18 you will need someone to be your operator, and that would usually be your parent/guardian, but could be anyone who is already registered or prepared to take on the role.

You must mark all your model aircraft with your (or your operator's) registration ID, clearly displayed on the fuselage or within a compartment that can easily be accessed without the use of a tool. The marking has to be in English in letters at least 3mm high, but there is plenty of scope to creatively and legally mark even a competition scale model.

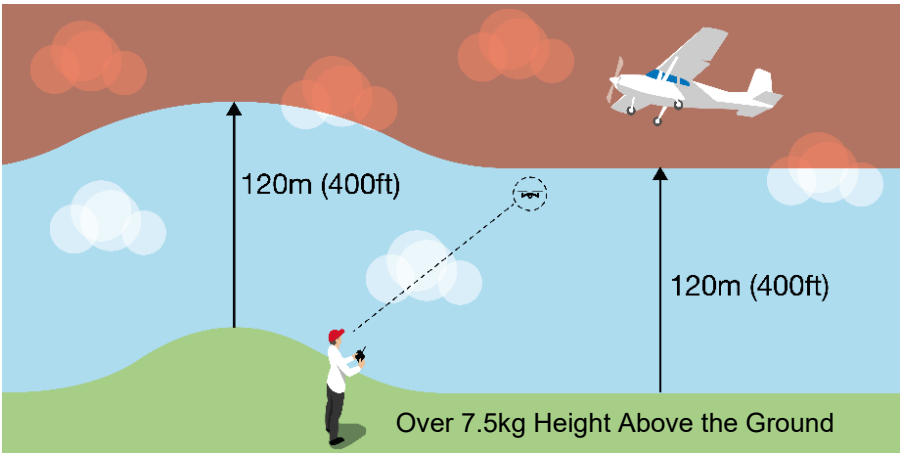
The only model aircraft that do not need marking are those only ever flown indoors, those under 250g without a camera fitted or control line models under 1kg.

2.2.2.2.1 Operator Responsibilities

In most cases you will be both the operator & remote pilot, so in addition to the responsibilities you have as pilot-

- Make sure that the model aircraft is sufficiently maintained, any repairs carried out to it have been properly done, and that the model aircraft is in a safe condition to be flown

If you are the operator and someone else is the remote pilot, you have responsibilities that you will not already have been doing as remote pilot-



- Make sure that the remote pilot has the minimum remote pilot competence
- Make sure that the remote pilot is aware of the limitations and conditions of the LMA operating authorisation and the content of this Handbook
- If your aircraft is being flown at a display, it is your responsibility to ensure that the pilot has the necessary currency if needed (see section 5.2.7.1), that the necessary permission for the display is in place (see section 5.1) and that the necessary notifications (such as a NOTAM) for the display are in place
- If your aircraft is being flown at a club site or a flyin where flight of aircraft over 7.5kg over 400ft is allowed, it is your responsibility as operator to be sure that the necessary permission for flight over 400ft is in place (see section 5.1) and that the necessary notifications (such as a NOTAM or AIP entry) for the site / event are in place
- Make sure that the remote pilot is aware of airspace restrictions in the area of the flight (flight restriction zone, danger area etc.)

2.2.3 Height Limit

The height limits that apply are-

1. Fixed wing models or twin rotor helicopters up to 7.5kg may be flown above 400ft. There is no upper height limit but you must remain in visual line of sight and be able to see the aircraft to control and avoid any manned aircraft.
2. Gliders 7.5kg - 14Kg may be flown up to 400ft above the remote pilot. This allows slope soarers up to 14kg to carry on at 400ft above the ground beneath the glider.
3. Inside a flight restriction zone, the height limit will be defined in the agreement with the aerodrome air traffic control.

All model aircraft over 7.5kg may not be flown over 400ft above the ground, unless permission from the LMA has been granted.

When flying above 400ft, the model must be flown manually. Gyros for stabilisation are allowed, but no autonomous or automatic flight. Automated flight is only permitted for fixed wing or single rotor helicopters under 400ft.

If flying above 400ft you should be especially careful to keep a good lookout for manned aircraft, which generally do not fly below 500ft. At a regular flying site you will be able to get a feel for the usual manned General Aviation (GA) traffic in the area which will allow you to know the most likely height and route of any manned aircraft you may encounter.

When flying from a new site, it is recommended to not fly above 400ft until you get experience of the usual manned GA traffic.

How can you tell how high your model is flying when it is limited to 400ft?

If your model aircraft is not fitted with a flight controller containing a barometric altitude sensor / GPS, telemetry altitude sensors can be used to tell you the aircraft's height during the flight. Be sure to zero the height reading before each flight if necessary.

You can also use the magic of the 3-4-5 triangle. If you walk 500ft from your model and remember how big it looks, then overfly a hedge or similar feature 100yards away, the model aircraft will be 400ft above the ground when it looks the same size as it did when 500ft away from you on the ground.

2.2.3.1 Flying Model Aircraft over 7.5kg Above 400ft

If you want to fly model aircraft over 7.5kg above 400ft either at a regular model flying site or at a specific event (such as a flyin), permission can be obtained from the LMA. See sections 5.1 and 6.1 for the details of where permissions are needed, what is available and what is needed to apply.

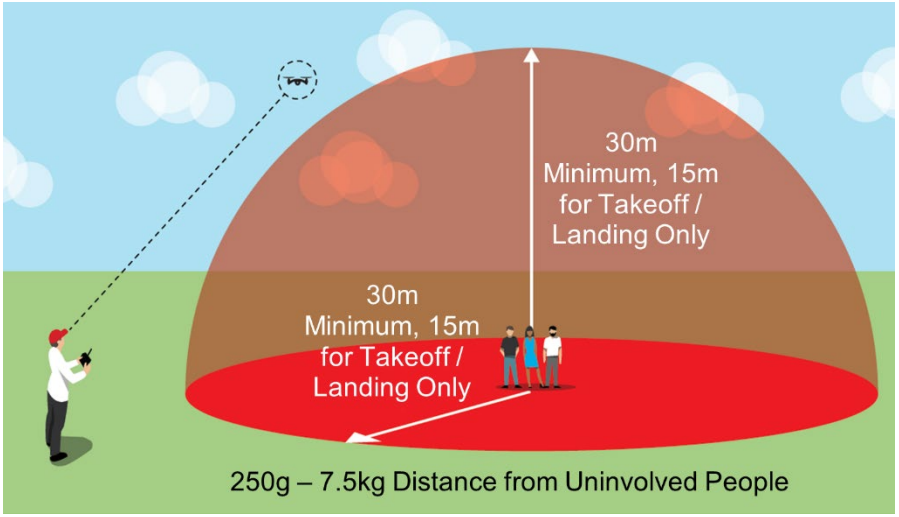
2.2.3.2 Military Low Flying Areas

If you are flying in a military low flying area, you could encounter fixed wing aircraft down to 100ft and helicopters down to ground level.

The full details of where military low flying takes place are on the MOD website

https://www.gov.uk/low-flying-in-your-area/where-and-when-low-flying-happens

Model aircraft displays and any other intense model aircraft activity (such as a flyin) should be notified through the Civil Aircraft Notification Procedure (CANP) process to make sure your location is known to any low flying military aircraft. Please contact the LMA Secretary for advice if needed.

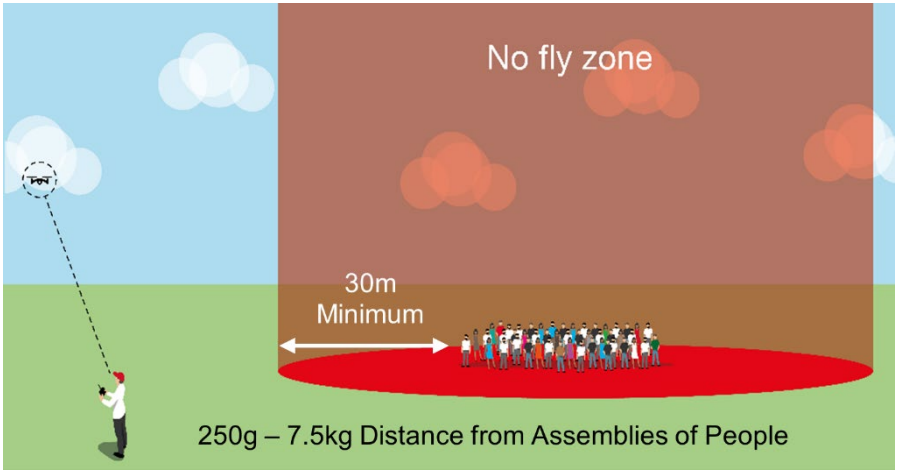


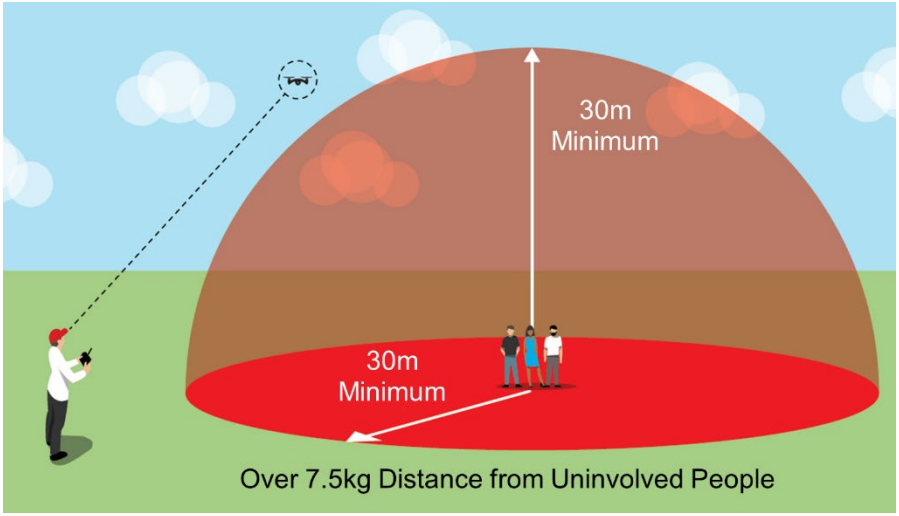
2.2.4 Distance from People

Model aircraft need to be kept minimum distances from two classes of people, uninvolved people and assemblies of people.

Uninvolved people are those who are not participating in the model flying or who are not aware of the instructions and safety precautions given by the model aircraft's operator.

People can be made 'involved' by giving them a specific briefing on what is happening and how they will be kept safe, but giving someone, for example, an event ticket with some printed instructions on the back is not enough to make people 'involved'.

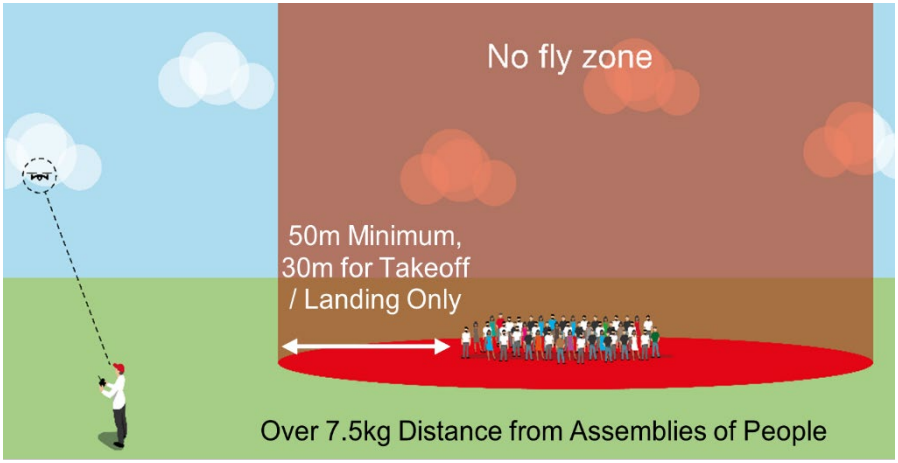




Assemblies of people are groups of people who are close enough together that they could not get out of the way if a mode aircraft was to crash.

Assemblies of people can be involved or uninvolved, but it doesn't really matter if they are involved in the flying and know the risks involved if they are unable to get out of the way of a crashing model because they are in a crowd.

The distances apply to all model aircraft that are not a free flight and are above 250g.



2.2.4.1 Distances from people - Model aircraft 250g - 7.5kg

Do not fly within a horizontal distance of 30m of assemblies of people. This means that you cannot fly in the 'cylinder' of air 30m around the nearest people, as shown above.

Do not fly within 30m of any uninvolved person. This distance may be reduced to 15m for take-off and landing if needed, but a risk assessment must be carried out and necessary mitigations put in place to protect uninvolved people. That means you cannot fly in the 'dome' around the people, as shown below.

2.2.4.2 Distances from people - Model aircraft from 7.5kg - 25kg

Do not fly within a horizontal distance of 50m of assemblies of people. This distance may be reduced to 30m for take-off and landing if needed, but a risk assessment must be carried out and necessary mitigations put in place to protect uninvolved people. This means that you cannot fly in the 'cylinder' of air 50m / 30m around the nearest people, as shown below.

Do not fly within 30m of any uninvolved person. That means you cannot fly in the 'dome' around the people, as shown below.

So, as you can see from the above, model aircraft may be flown over uninvolved people, but not over assemblies of people. It is strongly recommended though that you do not overfly anyone unless you absolutely have to, and minimise the time spent flying over them if you do.

2.2.5 Flight Over or Near Aerodromes

Flying model aircraft within the flight restriction zone (FRZ) of a protected aerodrome can only be done with the permission of air traffic control or the aerodrome operator.

A protected aerodrome can be one of the following:

- A CAA certified aerodrome (i.e. what we would typically call an airport)
- A Government aerodrome (i.e. a military airfield)
- A national licensed aerodrome (i.e. most smaller 'General Aviation' airfields, where the CAA has issued a licence to the airfield operator)

NATS have created an interactive map showing all the FRZ's https://dronesafe.uk/restrictions/

The extracts below show two airfields in the area around Manchester, and highlights as an example the different size and shape of the FRZ around Manchester Airport and Barton Aerodrome.

The 'standard' FRZ is a 2.5nm (4.6km) diameter circle around the centre of the airfield, with the addition of the 'stubs' extending to 5km and 1km wide in line with each runway.

Not all FRZ's are of the standard size, however as the Manchester and Barton FRZ's below show. Rather than try and draw the FRZ yourself, check on the dronesafe interactive map.

Even when flying from a fixed club site, it's worth checking periodically, as while aerodromes tend not to move, they can be established, closed or change their status.

If flying within an FRZ, the height limit will be defined in the permission granted by the airfield air traffic control / operator.

2.2.6 Occurrence Reporting

The safe operation of a model aircraft is as important as manned aircraft, and third-party injury and damage to property can be just as severe when caused by either type of aircraft.

Proper investigation of each accident, serious incident or other occurrence enables the causes to be identified and to help stop the same thing happening again, and the sharing of the causes and other safety related information is critical in reducing the number of occurrences.

As the LMA and the CAA operate a Just Culture, the reporting is NOT to mock, ridicule or punish accidents or mistakes, the reporting is to help everyone learn and hopefully stop the same thing from happening again.

Several things must now be reported to the CAA and the AAIB as both are a legal requirement and a requirement of the LMA's operating authorisation.

'Occurrence' means any safety-related event which endangers or which, if not corrected or addressed, could endanger an aircraft, its occupants or any other person and includes in particular an accident or serious incident.

2.2.6.1 CAA Mandatory Repots

All of the following must be reported to the CAA within 72 hours of them happening-

- If you have a 'near miss' with a manned aircraft
- If you have a mid-air collision with a manned aircraft
- If your model goes beyond visual line of sight during flight
- Any fatality or serious injury
- An occurrence involving operating above 400ft
- An occurrence involving operating less than 50m from uninvolved people

To make a report, use the reporting tool on the LMA website under the Resources menu.

2.2.6.2 AAIB Mandatory Reports

Accidents or Serious Incidents as described below must be reported to the AAIB without delay (which means straight away) if they take place between the time the model aircraft is ready to move with the purpose of flight and until it comes to rest at the end of the flight and the propulsion system is shut down.

Accidents where-

- A person is fatally or seriously injured
- The aircraft sustains damage or structural failure in operation* which results (or may result) in endangerment
- The aircraft goes missing or becomes completely inaccessible in a manner which could result in endangerment

Serious Incidents where-

- There are circumstances indicating that there was a high probability of an accident

To report, call the AAIB 24 hour reporting line on 01252 512299. Please contact the LMA Secretary on 07791 278292 immediately after contacting the AAIB.

For any accident or serious incident that does not involve an injury or damage to 3rd party property you can also use

investigations@aaib.gov.uk
as the contact email and cc secretary@largemodelassociation.com

If in doubt about whether to report something to the AAIB, call them on 01252 512299, they would rather have lots of 'nuisance' reports than have nothing reported.

* what is damage or structural failure? It is defined as anything-

- that does involve
  - anything that could adversely affect the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component
- that does not involve
  - engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories),
  - Damage to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes)
  - minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike

The damage or structural failure can be either the cause of the accident or as a result of the accident. Basically, if your model aircraft heads for the horizon or the centre of the earth of its own accord, or if you need to replace or repair anything 'in scope' above, a report to the AAIB needs to be considered if any person or manned aircraft was endangered or it's reasonably plausible that they could have been endangered.

If a report to the AAIB is needed, ideally contact them before moving the model aircraft, or take plenty of photographs of

the aircraft and the incident site before moving it.

If the AAIB decide to carry out a formal investigation, the LMA will be involved as the authorisation holder and the specialist organisation, so people who know model aircraft flying will be involved in the investigation.

To make a report, use the reporting tool on the LMA website under the Resources menu.

2.2.7 Flying at Night

There are no specific requirements for flying at night, but all requirements of flying during the day still apply, so you must be able to keep the aircraft in visual line of sight at all times. If the lights fail, you will have to be very quick with a very good torch to keep the aircraft in sight.

Only fly at night at a site you have seen during the day, so you know the layout of the site and location of any hazards (like trees) and only fly from a site where you know the location of any uninvolved people.

Be especially careful of the lack of depth perception when flying at night, and how that could affect your ability to maintain a safe distance from uninvolved people and separation from manned aircraft.

2.2.8 Dropping Items from Model Aircraft

You as the remote pilot can drop material from model aircraft, but they must not endanger people or property. That means water ballast, toffees, dummy bombs, flour and so on can be dropped, provided it is done in a safe area clear of people & property. No dropping any animals from a model aircraft though, no hamster or small dog really has a desire to try parachuting.

2.2.9 Commercial / Non-Commercial Model Aircraft Flying

The only types of model aircraft flying that can be carried out under the LMA's operating authorisation are sport, recreation, education or demonstration at a model flying display.

Flying for direct payment is not allowed, but if for example you have built or repaired a model aircraft as a paid service, you can demonstrate the model flying as part of the service. The BMFA's insurance may not cover you for this flying however.

2.2.10 Flights by Overseas Visitors

Pilots / operators visiting from overseas will need to be either temporary or full members of the LMA in addition to being either temporary or full members of the BMFA.

As the CAA does not have any reciprocal agreements with any other country, visiting pilots will be required to demonstrate remote pilot competency (using any of the methods in 2.2.2.1.1) and either register themselves as an operator with the CAA (either directly with the CAA or through the LMA) or have a UK registered 'host' operator and mark all their model aircraft with the operator ID before they can fly in the UK.

2.2.11 Trial / Training Flights

If using a 'buddy box' master / student radio control for training or giving

trial/experience flights, only the person with the master controller is the remote pilot and the only one who requires remote pilot competency and the only one who needs to be an LMA member.

2.3 Flying Model Aircraft

2.3.1 Weather for Flying

It is not recommended to fly in the rain, for radio controlled model aircraft the electronics both in the aircraft and in your hands don't usually agree with wet weather, and the range of the radio can be reduced by water in the atmosphere. If you wear glasses, rain on the lenses can be very distracting. Snow is like rain when falling, just a bit colder, but flying with skis fitted in the snow is good (if chilly) fun.

Flying in mist or fog is not recommended, as there is a greater risk of losing sight of the aircraft.

There are no explicit wind limits, the main risk of flying in windy conditions is with slower flying aircraft that can be very quickly blown downwind and not have the airspeed to get back to the runway again.

There are two risky things caused by strong winds-

Turbulence from trees, hedges & buildings.

Downwind of trees and other features will be turbulent air, and the turbulence can carry on for a long way downwind. Be especially careful if flying from a site that requires a landing approach over a hedge.

'Downwind' turn.

When flying in a strong wind, a model aircraft flying at a constant airspeed will look from the ground to be flying into wind considerably slower than it looks to be flying downwind. For example, a model aircraft with a stall airspeed of 20mph and a cruise airspeed of 40mph, when flying circuits at cruising airspeed in a 20mph wind will have a groundspeed of 20mph flying into wind and a groundspeed of 60mph flying downwind.

The risk is that the model will appear to be flying too fast downwind, so you may be tricked into slowing the model down flying downwind. That can bring the model dangerously close to the stall speed.

When turning the model flying downwind, the temptation is to make the turn look the same shape from the ground and turn far tighter than the into wind turn. As a rule of thumb, a 45 degree bank increases the stall speed by 20% and a 65 degree bank increases the stall speed by 50%.

The mixture of slow airspeed and a tight turn can easily cause a stall and rapid spin / crash, especially when on a landing circuit, so be especially careful in strong winds.

2.3.2 Running a Model Flying Club

Any group of LMA members can form themselves into a club. If you want to become an LMA affiliated club, please contact the LMA Secretary for advice.

Club officers are not responsible for enforcing full compliance with all of the Article 16 operating authorisation, as some parts like pilot and operator responsibilities are entirely up to the

individual member, but feel free to help them as much as they need.

The site-specific organisation and carrying out formal risk assessments where needed is the responsibility of the club, and all members need to be made aware and understand what safety mitigations are in place.

It is recommended that a risk assessment is carried out for the club's normal flying activities anyway, even if not specifically required by the operating authorisation.

2.3.2.1 Data Protection

If you are running a club and storing member data, you may need to comply with the General Data Protection Regulations (GDPR), if you need help please contact the LMA Secretary.

2.3.3 How to Operate and Set up a Radio Controlled Model Aircraft Flying Site

Because the rules have changed, the guidance below applies to existing and established flying sites, and also to setting up a new flying site and also to having a quick fly in a park at dinnertime.

When choosing a location to fly model aircraft, there needs to be sufficient space available for the size of models to be flown to ensure that the minimum separation distances from uninvolved people are maintained at all times by all members who fly there.

The airspace the site is in needs to be investigated, and if the site is within an FRZ, the air traffic control of the airfield need to formally agree to the model flying taking place. It would be wise to speak to them to get their agreement before proceeding with an otherwise promising flying site.

The car park / pits area should be at least 30m from the nearest model flying to cater for uninvolved visitors. Although overflying involved and uninvolved people is allowed at 30m altitude, it is highly recommended that the site should be laid out so that people and property are not overflown at any time.

If possible, arrange the site to allow for flying not facing into the sun to prevent loss of visual contact with the model in flight. There may need to be several different site layouts to cater for wind direction & position of the sun during the day.

A site plan should be drawn up and provided to all members to prevent any misunderstandings. It is important to highlight any 'no fly' areas, alternative site layouts and when they are to be used.

If a public footpath, bridleway, road or similar crosses or runs alongside the site and cannot be avoided, it must be overflown at a minimum of 30m (100ft) at all times, unless models under 7.5kg need to fly overfly lower, to a minimum of 15m (50ft) for takeoff and landing only. If they do, a written risk assessment needs to carried out, a copy of the risk assessment filed with the LMA Secretary and everyone who flies there made aware of the risk assessment and any risk mitigation procedures in place.

If the site would regularly have assemblies of people within 50m of any part of the expected flying area, it should be carefully considered whether the site is actually suitable.

If you are intending setting up or are already running a flying site in a 'built up area', which is effectively-

- a public park / playing field
- within or directly adjoining
  - the settlement boundary of a town or village
  - an industrial estate / area
  - a shopping centre / retail park

you must carry out a written risk assessment of the site and the flying to be carried out, file a copy of the risk assessment with the LMA and make sure everyone who flies there is aware of the risk assessment and any risk mitigation procedures in place.

2.3.4 Flying from Temporary / Ad-Hoc Sites

If you want to fly on your own either regularly or occasionally at a public park / playing field, it is highly recommended that only models below 7.5kg are flown there, as it is unlikely you will be able to safely fly models any larger at that location.

Before flying you should check whether there are any applicable byelaws or specific prohibitions on flying unmanned aircraft in that location. If there are no obvious signs, check the local council website.

You must make sure that you only overfly people when strictly necessary and keep away from them by at least 30m (100ft), and only get within 15m (50ft) for takeoff and landing.

If there are any large groups of people, make sure to keep at least 30m horizontally from them. You must carry out a risk assessment of where and how you are going to fly, and it is strongly recommended that the risk assessment is written, and a copy filed with the LMA Secretary. A risk assessment is only needed once for each location.

2.3.5 Slope Soaring Flying

Sites for slope soaring are generally similar to public parks and are often in areas popular with walkers and tourists. Treat the soaring site as a park above, and make sure risk assessments are carried out. Many slope soaring sites are on National Trust land and permission is usually given even if 'drone' flying is banned on most National Trust property.

2.3.6 Control Line / Round the Pole Flying

Control line and round the pole aircraft are flown tethered to fixed point, either to the pilot themselves or a tether point (a pole).

Control line aircraft are flown by the pilot who stands in the middle of the 'circle' the aircraft flies round and holds on to a control handle connects them to the aircraft by the control lines, and those lines both control the aircraft and stop it from flying off.

Round the pole aircraft are usually radio controlled but fastened to the pole by a line, so fly in a circle like control line aircraft. The pilot stands outside the circle with the radio control transmitter.

The rules for flying control line (CL) / round the pole (RTP) are slightly different to flying other types of model.

There is an exemption in the Article 16 authorisation that removes the need for

permission to fly a CL/RTP model aircraft in an FRZ (outside the airfield boundary) for model aircraft up to 7.5kg with a line length up to 25m, provided the flight is not within the Runway Protection Zone (RPZ) part of the FRZ. Permission from the airfield's air traffic control is required to fly over, or within the boundary of an airfield within an FRZ. This exemption only applies to fixed wing aircraft that are not capable of taking off or landing vertically.

Pilots of CL / RTP models do not need any remote pilot competence, and CL/RTP models up to 7.5kg and flown with lines up to 25m do not need to be marked with operator registration ID.

The separation distances from uninvolved people and assemblies of people apply to CL / RTP flying too, so for models under 7.5kg the model in flight must get no closer than 30m from uninvolved people reduced to 15m for takeoff and landing with a supporting risk assessment, and no closer than 30m from groups of people.

While CL & RTP aircraft cannot fly outside a hemisphere of the line length, they still have the potential to cause harm. Not only the aircraft, but the effectively invisible control lines could seriously hurt someone, so everyone except the pilot(s) need to be kept out of the 'circle' the model flies within during flight.

If you are not flying at a site with access control, you will need to have someone marshalling the flying to ensure nobody inadvertently enters the circle while models are flying.

If CL / RTP models are regularly flown at a flying site, consider having defined fenced circles to keep people clear of the models and the lines.

2.3.7 Free Flight Flying

Free flight is also a bit different from other types of flying, primarily because there is little control of the model aircraft once the flight starts. The mandatory separation distances for other types of flying do not apply to free flight model aircraft up to 7.5kg, but there is still a duty to keep clear from uninvolved people and not endanger anyone.

The 'remote pilot' is the person in charge of the model as far as the responsible roles go, the operator is the same as any other model aircraft. Normally the person in charge is the person who launches / releases the model, but they could direct somebody else to do it for them if needed.

If there is a significant risk that the performance of the model aircraft will enable it to fly above 400ft or beyond visual line of sight, you are strongly advised to fit a dethermaliser, either automatic or radio controlled.

There is no height limit for free flight model aircraft, but you must keep the model visual line of sight at all times and be able to monitor the flight to avoid potential collisions with manned aircraft. If the model is capable of exceeding 400ft, a dethermaliser is recommended to be able to quickly end the flight if a manned aircraft is close.

The area the model is to be flown in (the 'flight volume') needs to be chosen to be large and open enough that the model will remain in the area with the model trim & weather on the day, and also enable you

to see the model (visual line of sight) throughout the entire flight. The flight volume must not enter an FRZ or other restricted airspace without the relevant permissions.

It is good practice to check the flight volume on an OS map / Google Earth or similar for the presence of footpaths, bridleways or tracks.

Before launching the model, you as remote pilot need to be satisfied that-

- The launch area is clear of uninvolved people who could be harmed by your model
- No uninvolved people, who may be endangered by the model, will enter the flight volume during the flight.

If there are any footpaths that enter / cross the expected flight volume, the launch point can be chosen depending on the exact weather conditions on the day to minimise the chance of footpath(s) and similar being overflown.

The model must not be deliberately flown beyond the visual line of sight of the remote pilot, unless an additional authorisation is in place.

If the performance of the model gives a likelihood of the model being able to fly beyond the pilot's line of sight, a dethermaliser is recommended, to be able to quickly end the flight before it goes out of sight.

2.3.8 Indoor Flying

Flying indoors does not come under the regulation of the CAA, so none of the rules of the LMA's operating authorisation apply.

You still have a responsibility to not hurt anyone or damage anyone's property when flying indoors, so please fly carefully.

2.3.9 FPV Flying

First Person View (FPV) lets you fly a model aircraft using a camera fitted in the aircraft that shows you what the model sees rather than flying by looking at the model from the ground.

There are two options for carrying out FPV flying, and the arrangements will depend on what you're doing, how many people are flying, and the size of the aircraft being flown.

If flying on your own or in a small group, each person will require a spotter who acts as the pilot's eyes and keeps the aircraft in visual line of sight to avoid collisions with other aircraft or people. With your own spotter, you can fly up to 1000ft above the ground with fixed with aircraft up to 3.5kg (multirotors are limited to 400ft above the ground).

For a race meeting, the most appropriate way would be to use a defined 'sterile area' to contain all the flying. Each pilot does not then need their own spotter, that role is carried out by a defined 'race director' or someone in charge and sufficient competent marshals to ensure that either uninvolved people do not enter the sterile area or aircraft do not leave it. In a sterile area without your own personal spotter, you can fly up to 160ft (50m) above the ground and aircraft up to 25kg.

2.3.9.1 FPV flying in a Sterile Area

Procedures for the race should be defined by the race organiser(s) to include at least-

- Race Director's role
- Pilot's briefing
- Observers' roles & briefing
- Site layout
- Frequency management
- Aircraft airworthiness
- Emergency procedures

2.3.9.1.1 Race Director

The race director has overall charge of the flying, and should be located near the pilots to be able to communicate with them easily. They should also be in radio contact with all the observers to know of any issues around the course & flying area.

It is the responsibility of the race director to have emergency procedures in place and to stop the race / flying in case of an emergency that might put uninvolved people or property at risk, and the race director should define the commands that they will use. Example commands are-

Terminate race - this command should be used in case of one aircraft departing the race area or a serious risk of uninvolved people entering the flying area

Land immediately – this command should be used in case of a low-level aircraft potentially entering the flying area or an uninvolved person entering the flying area.

2.3.9.1.2 Pilots Briefing

Before the flying starts, all pilots should be briefed by the race director on as a minimum

- Frequency control in operation
- The layout of the course
- The use of specific commands (such as Terminate Race or Land Now) from the race director
- Any other pertinent information

2.3.9.1.3 Observers

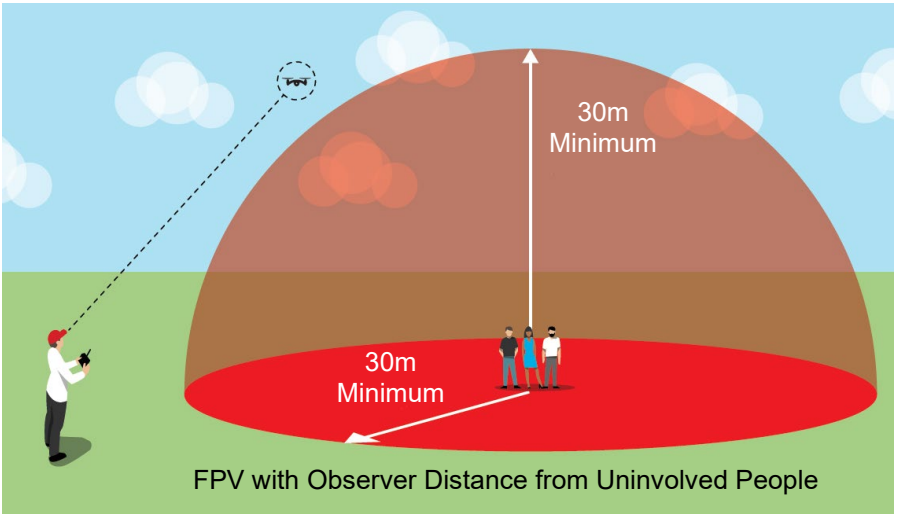
There should be enough competent observers to make sure that the whole boundary of the race area can be seen at all times, and all observers should be in radio contact with the race director

All observers should be briefed before flying starts to ensure that

- they know their area of the course flying area
- they know what they are looking out for
- uninvolved people potentially or actually entering the flying area
- an aircraft potentially or actually departing the flight area
- a low-level aircraft / helicopter approaching the flying area
- what radio calls to use to warn other spotters and the race director

2.3.9.1.4 Site Layout

The flying area must be a cordoned off, closed area that uninvolved people are



physically excluded from and all the flying takes place within the area.

A separation distance should be used between the edge of the defined flying area and the edge of the cordon should be separated by the maximum flying height using the 1:1 rule (e.g. if flying up to a maximum of 30m, a 30m separation distance. This will help ensure that aircraft remain within the sterile area in case of a crash / collision / failure, and also means that unless flying slowly at a height of less than one metre, a domestic garden would not be a suitable location for a 'sterile area'

2.3.9.1.5 FPV Frequency Management

Most FPV aircraft use two separate radio systems on two separate frequencies, one for the radio control of the aircraft and one for the video feed back to the pilot's ground station. In most cases, 2.4GHz is used for the control, and 5.8GHz used for the video.

While the 2.4GHz equipment uses frequency-hopping to prevent multiple systems interfering with each other, the 5.8GHz video transmission equipment does not in most cases automatically frequency hop and avoid interference.

Instead, each aircraft / ground station will operate on a fixed channel, and each aircraft will need to be on a separate channel to avoid interference and control difficulties. Consult the manufacturer's instructions for your FPV equipment to understand what channels can be used and how to set the channel in use.

For the race event, a frequency management system and plan should be in place to prevent channel clashes during races.

2.3.9.1.6 FPV Aircraft Airworthiness

It is usual that the aircraft used for an FPV race will be multirotors, and the race organisers should have measures in place to ensure that

- Every aircraft flown is airworthy and the ground control systems are in working order
- Every aircraft has a 'failsafe' setting that is appropriate to the course & flying location. A standard 'return to home' may not be appropriate if flying through woodland for example, so stop and land would be a safer alternative setting.

2.3.9.2 FPV Flying With an Observer

If you choose to fly in 'general' airspace with an observer, you as remote pilot must be accompanied by your observer during the entire flight.

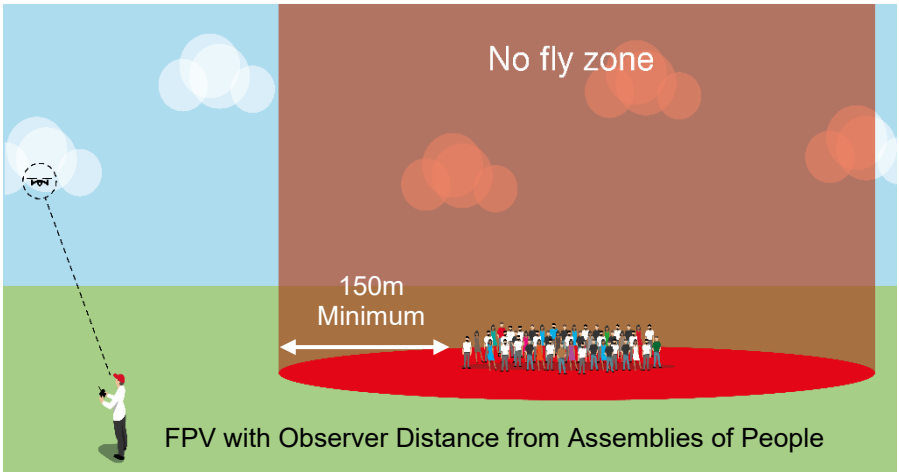
Your observer must be competent, and it is your responsibility to be sure they are competent and know what to do.

Their job is to keep the model aircraft in direct unaided visual contact throughout the entire flight, and warn / advise you if there is a risk of collision with any other aircraft, any person any vehicle or any structure.

Unless flying alone, you should check with other FPV fliers and agree which channels you will use, and follow the guidance on frequency management in section 2.3.9.1.5

The following conditions also need to be met

i. The aircraft does not exceed 3.5Kg
ii. Do not fly within an FRZ, unless permission from the aerodrome air traffic control has been granted
iii. Do not fly above 1000ft for fixed wing & single rotor helicopters and not above 400ft for multirotors



iv. All site risk assessments must have been carried out if necessary, depending on the type & location of the flying site (see sections 2.3.2 & 2.3.3)

v. Do not fly over or within 150m of any assemblies of people

vi. Do not fly within 30m of any uninvolved people

vii. Do not fly within 50m of any vessel, vehicle or structure which is not under the control of the remote pilot.

2.4 How to carry out a Risk Assessment

There are several scenarios described previously where you are now required to carry out a formal risk assessment as part of the LMA's operating authorisation.

A template risk assessment form is provided in Appendix 2, but you can use your own if you prefer.

There is no magic to doing a risk assessment, at its simplest it is what we all do all the time as we meander through life. What could go wrong, what or who could be harmed, and what can be done to either reduce the risk of something going wrong or the harm that could be caused.

There are five steps to doing a risk assessment-

Step 1: Identify hazards, i.e. anything that may cause harm – for example a model aircraft crashing or control being lost

Step 2: Decide who may be harmed, and how – for an example a model aircraft crashing & hitting an uninvolved person and how much harm it may do to them

Step 3: Assess the risks and take action - what is the risk of a model aircraft crashing & hitting an uninvolved person, and what can be done to reduce either the risk, the harm or both to an acceptable level

Step 4: Make a record of the findings - write your assessment down in the template in Appendix 2 and file a copy with the LMA Secretary

Step 5: Review the risk assessment – once per year, look at the risk assessment to see if anything has changed or needs to be changed

Once you have completed the necessary risk assessment(s) you need to make sure that all club members who fly at the site are provided with the risk assessment and a re familiar with what it means and what the risk mitigations that need to be put in place are.

If you need any help or advice or guidance on how to carry out a site risk assessment and what to do with it, please contact the LMA Secretary.

2.5 Model Aircraft Airworthiness - All Models

Before going flying, with your 'operator' cardigan on, you need to make sure that every model aircraft you are planning on flying has been maintained and repaired (if it needs repair) to a good standard so that it is safe to fly.

Before each flight with your 'remote pilot' trousers on carry out a pre-flight check to make sure that the aircraft is in a good and safe condition to fly.

It is also recommended to do a post-flight check after each flight to check for any damage that your operator / you as operator will need to repair before the next flight.

All radio controlled models and electrically powered models will require some wiring. Unless you are confident in your soldering / crimping equipment and skills to be able to make a good joint, please use pre-made commercial wiring, get someone competent to do the soldering / crimping for you or learn how to do it yourself with the right tools. Poor quality electrical connections can cause intermittent failures, total failures, fires and other problems.

Many radio control systems include telemetry that can give a warning as to the quality of the radio link or the condition of the onboard battery, and should be used if the functionality exists.

Telemetry sensors can also give you airspeed, fuel / battery used and altitude which can help with knowing how close to the edge of safe performance you are reaching. Don't forget that GPS sensors can only give ground speed, not airspeed.

All of this functionality comes at the cost of complexity, and software / firmware updates of radio control systems are now a fact of life. Please register for email updates with your radio manufacturer to be informed of any safety-critical firmware updates that you radio may need.

If you are not confident in updating your equipment if required, please ask for help from someone who is.

2.5.1 Radio Control Failsafe

The point of a radio failsafe is to land the model as quickly as possible to prevent the model aircraft from flying beyond visual line of sight of the pilot or exceeding the height limit in case the radio control link is lost for whatever reason.

All radio controlled model aircraft that have failsafe functionality in the radio control system (which is basically every radio made for at least the past decade) must have the failsafe set.

All model aircraft over 7.5kg and gas turbine powered model aircraft must have a radio failsafe fitted and operational.

If fitted or required, the failsafe should if triggered, as a minimum either-

- Return to home
- Reduce the engine(s) to idle power
- Reduce electric motor 'throttle' to zero
- Gliders, deploy airbrakes, flaps or flight controls to enter a spiral dive

Model aircraft with a flight control system that includes 'return to home' failsafe functionality must have the 'home' point set and confirmed immediately before takeoff.

Whatever type of failsafe setting is used, it should be tested regularly (at the start of each flying session) for correct functioning.

2.6 Special Considerations for Flying Model Aircraft 7.5kg – 25kg

Remote pilots of large radio control models should be aware that such models may have different operating characteristics to smaller models, several of which may not be initially apparent. The greater mass and inertia of a large model, combined with a generally more robust (less compliant) structure can lead to less 'forgiving' behavior, especially on takeoff and landing.

You may also have visual perception problems caused by the size of the model. This usually takes the form of the aircraft being much further away than you think and can cause positioning problems in flight and danger on landing due to the large 'swept' area on the approach. Be aware of this problem, especially when flying at low level.

When constructing the model ensure that all parts have adequate strength for the task they perform and that a suitable glue is used for the types of joint.

If using composites, the direction of the fibers is very important to the strength of the part, and be aware of the expiry dates on resins.

Pay special attention to the way in which wing loads are transferred between the wing structure and the fuselage. All detachable flying surfaces should have a positive lock to their mounting so that they cannot be shed in flight.

Never use long unsupported control rods to the control surfaces or plastic clevis connectors as control forces will be high. Each aileron should have its own servo and the elevator should preferably have two independent servos with either-

a. a mechanical interconnection so that either can drive the control surface (with reduced movement) should the other fail

b. each servo driving one half of the elevator through separate pushrods.

Pay particular attention to the state of the battery and the switch harness. Ensure that the batteries in both the model and the transmitter have adequate capacity for the flight to be undertaken and are fully charged for each flying session. As loss of battery power for the radio is the most frequent cause of system failure, lithium batteries (Either LiFe or LiPo with a regulator) or Sub-C sized cells will be able to cope with the demands of high power servos and large control forces. Two onboard batteries & switches and radio telemetry of battery condition are highly recommended.

It is recommended that remote pilots of model aircraft over 7.5kg hold an LMA Full Proficiency or equivalent, such as the BMFA 'B' or SAA Silver Wings.

3.1 Introduction

The weight at which additional oversight is required changed from 20kg without fuel to 25kg MTOM (the weight of the aircraft with all batteries fitted and fuel / smoke tanks completely full) in 2020. All over 20kg exemptions were cancelled by the CAA on 1 January 2022.

Every model aircraft over 25kg needs a specific flight test permit or permit to fly from the LMA to fly anywhere in the UK, no matter who owns the land the model aircraft is flying from, and no matter whether the fling is in private or at a public display.

All over 25kg permits to fly are valid for one year and need renewing annually.

3.2 Summary Of The Over 25kg Approval Process

A model will be inspected throughout the design and build process by an LMA appointed inspector, who will ensure that the model design and quality of build meets the requirements of the scheme. Until the inspector is satisfied and the final inspection successfully passed, no test flights can be carried out.

Flight testing is then carried out in private to prove that the model performs correctly, and as importantly, that the pilot is competent to fly the model. All test flights must be in the presence of an LMA appointed flight test witness, who will record the flight.

Once test flying has been successfully completed, a permit to fly will be issued by the LMA which will allow the pilot(s) named on the permit to fly the aircraft and fly at displays, and will need to be renewed annually.

Pilots not named on the permit to fly can fly the aircraft under test flight conditions as per section 3.3 to have themselves added to the permit to fly as a named pilot.

Once the aircraft is in service, if it is repaired or modified, an inspection may be needed depending on the size and scope of the repair or modification.

If the remote pilot is under 18, the operator (who must be over 18) must be physically present whenever the aircraft is flown.

3.3 Test Flying of Over 25kg Model Aircraft

The flight test programmes for over 25kg model aircraft can be carried out with a flight test permit issued by the LMA without the need for an authorisation from the CAA. Once flight testing has been successfully completed, an application must be made to the LMA for a permit to fly.

The process for flight testing is-

1. Final inspection of the model aircraft carried out by the inspector(s) and a final inspection report submitted by the inspector to the LMA

   If the aircraft is over 80kg, the final inspection should also involve a Senior Inspector

2. Final inspection report checked by the LMA and a Certificate of Design & Construction issued by the LMA
3. Over 25kg Flight Test Permit specific to that aircraft and valid for twelve months is issued digitally by the LMA to the aircraft operator

4. When the operator is in possession of the flight test permit, the flight testing may begin.

5. The flight test requirements / period / limitations that apply to the aircraft will be detailed on the Flight Test Permit in addition to any aircraft specific limitations. The required flight test period may be greater than the minimums given below.

   The minimum flight test periods are-

   Any over 25kg aircraft – 6 flights / 1 hour

   Over 50kg turbine powered aircraft – 12 flights / 2 hours

   Any over 80kg aircraft – 12 flights / 2 hours, one flight must also be witnessed by a Senior Inspector

6. Every flight must be at a site specifically approved by the LMA for test flying over 25kg model aircraft

7. Every flight must be witnessed by an LMA approved flight test witness or inspector and details of the flight recorded on the flight test log

8. Any pilot may fly the aircraft during flight test to be a named pilot. If multiple pilots fly the aircraft, each must complete the minimum flight test period and complete their own flight test log

9. When the test flight programme is successfully completed, the flight test log is submitted to the LMA by the aircraft operator

10. The flight test log is reviewed by the LMA and a Certificate of Flight Test issued by the LMA

11. A permit to fly is issued by the LMA specific to that aircraft with named pilot(s) who have completed the flight test programme and valid for twelve months is issued digitally by the LMA to the aircraft operator

12. The aircraft can be flown while waiting for the permit to fly to be processed. All flights must be in the presence of an LMA approved flight test witness or inspector

There are no named pilots for flight testing on the flight test permit. Anyone who the aircraft's operator allows to fly the aircraft and is agreed by the flight test witness can fly the aircraft, but only for the purposes of completing a flight test programme.

Once the flight test process is completed and a permit to fly issued, other pilots may become named pilots on the permit to fly by carrying out a flight test programme in accordance with steps 6, 7 and 8 above. A revised permit to fly will then be issued to add the extra pilot(s).

3.3.1 Test Flying Over 25kg Model Aircraft Over 400ft

Where flight testing is carried out at a flying site that has been granted an LMA permission for routine flight above 400ft in accordance with Article 16 section 4.7, test flights may be carried out up to the maximum permitted height above the ground at that site, subject to the following conditions-

1. The first flight of the flight test programme must be limited to a

maximum height above ground level of-

a. For powered aircraft and powered gliders, 400ft

b. For unpowered gliders, 1000ft (or the maximum permitted height if less than 1000ft)

2. Provided the first flight is successful and there are no performance, handling or other issues that could increase the risk of flying over 400ft, the aircraft may be flown up to the maximum permitted height for that location during subsequent test flights.

3. Every flight over 400ft must have a spotter / helper with the pilot to monitor the flight and assist the remote pilot with their lookout for manned aircraft, in addition to the flight test witness.

After the first flight and the first flight over 400ft / 1000ft, it is recommended to check the actual height reached during the flight using the GPS data logs. This will enable the pilot to visually recognise the height of the aircraft during flight.

During the test flights, only expand the distance from the pilot and height flown towards the maximums as pilot's experience of the aircraft grows. Do not immediately fly to 500m distance and site maximum height straight away.

When carrying out higher risk manoeuvres (such as stalling) make sure that the aircraft is horizontally close to the pilot and not at the edge of the flight area. This means that the pilot will be better able to see the aircraft to recover from the manoeuvre (stall), and if the aircraft does anything unpleasant it does not go outside the flying area.

These conditions apply to every flight test programme, whether for a new aircraft and pilot or a previously authorised aircraft adding a new pilot or changing operator.

If there are any issues found on the first flight that would make the aircraft unsafe to fly higher, it is likely they will make the aircraft unsafe to fly at any height, so they must be investigated and addressed before further flights.

If there are any issues found on flights over 400ft that would make the aircraft unsafe to continue to fly over 400ft (such as radio range issues), they must be investigated and addressed before further flights.

The subsequent flight after an investigation / modification must be treated as a first flight and the conditions above apply.

3.4 Flying Sites for Model Aircraft over 25kg

Model aircraft over 25kg with a permit to fly may only be flown from sites that are suitable for their operation. It is the responsibility of the remote pilot to ensure that the aircraft is only flown from a suitable site, and the following criteria should be used as a guide to suitability.

The performance of the aircraft demonstrated during the flight test programme will give the minimum required runway length for takeoff & landing, and the types of runway (long grass, short grass or hard surface) that can safely be used.

The site must allow separation distances from uninvolved people (50m reduced to 30m takeoff & landing only) and assemblies of people (75m at all times) must be maintained at all times.

Sites that require a reduction in separation distances below 30m for takeoff and landing in accordance with Section 2.3.3 would not be considered to be suitable if the site layout or weather conditions would require the reduced distances to be used.

The runway must be long enough for the takeoff and landing distances required by the aircraft.

A runway that is too short for the aircraft will risk taking off in a semi-stalled condition & significant risk of subsequent loss of control.

A runway that is too short for landing will risk flying the approach at too low an airspeed, risking a stall, or an attempted go-around / aborted landing and the risk of stall.

The proximity of trees and large hedges should be carefully considered as they can cause significant low-level turbulence. Although larger and heavier model aircraft can generally handle turbulence better than smaller model aircraft, the higher inertia and slower control response rate of a large model aircraft can lead to an unrecoverable upset if the aircraft experiences significant low-level turbulence when at low speed at takeoff or landing.

A site layout that would require a turn immediately after takeoff or immediately before landing to avoid obstacles or no-fly areas would not normally be considered suitable.

The maximum distance from the remote pilot is 500m, and it is not expected that a clear 1 km diameter circle around the pilot is available, but sufficient 'clear' airspace around the pilot for the weather conditions is available to suit the speed and manoeuvrability of the specific aircraft.

It should be checked whether the site is within a military low flying area, as there are large areas where military helicopters especially can operate down to ground level.

3.5 Record Keeping for Model Aircraft over 25kg

It is a requirement of over 25kg permits to fly and over 25kg flight test permits that the operator ensures-

- That records are kept of any substantive maintenance activities on the entire aircraft system.
- That records of each flight made are maintained and make such records available to the Civil Aviation Authority on request as set out in point UAS.SPEC.090 of Regulation (EU) 2019/947 as retained in UK law.

Note that the 'entire aircraft system' now includes the transmitter as that is a reasonably important part of operating the aircraft.

The CAA have not specified what needs to be recorded and in what format, but CAP722 gives in Section B3.1.5 'Record keeping' the requirements for operations in the Specific Category, the category under which all over 25kg model aircraft are operated

Flight activities for each UAS should be recorded by the UAS operator within a logbook.

The logbook may be generated in either electronic or paper formats.

If the paper format is used, it should contain, in a single volume, all the pages needed to log the holder's flight time. When one volume is completed, a new one will be started based on the cumulative data from the previous one.

Records should be stored for 2 years in a manner that ensures their protection from unauthorised access, damage, alteration, and theft.

The following information must be recorded:

- the identification of the UAS (manufacturer, model / variant, serial number);
- the date, time, and location of the take-off and landing;
- the duration of each flight;
- the total number of flight hours / cycles;
- the name of the remote pilot responsible for the flight;
- the activity performed;
- any significant incident or accident that occurred during the operation;
- a completed pre-flight inspection;
- any defects and rectifications;
- any repairs and changes to the UAS configuration

It is therefore not unreasonable to expect that this is the level of record keeping that will be needed to satisfy the requirement.

A template aircraft logbook in Excel format can be downloaded from the LMA website under Resources - Over 25kg Scheme

3.6 Modifying or Repairing Model Aircraft over 25kg

Significant modifications or repairs to over 25kg aircraft need to be notified to the LMA and inspected by an LMA inspector. Witnessed test flights will normally be needed when the modification or repair is completed.

If your aircraft needs a significant repair, please notify the LMA by completing the form on the LMA website before starting work so an inspector can be appointed.

Significant modifications or repairs are-

- Any change or repair to the load bearing primary structure
- Any change or repair to the load bearing secondary structure larger than 100mm in any direction
- Any change or repair that will change the MTOM by more than 5%
- A change to the radio control system that is not a functionally like-for-like replacement
- An introduction of new control system functionality (such as installing a gyro stabilisation system)
- A change to the powerplant or fuel system that is not a like-for-like replacement
- If fabric covered, replacement of more than 25% of the covering

3.7 Buying and Selling Model Aircraft over 25kg

If you buy or sell a model over 25kg you need to inform the LMA using the notification form on the LMA website

The permit to fly expires when the operator changes, and the new operator will need a new permit to fly in their name.

If there are any modifications to the aircraft (such as new radio or new engine), they will need to be inspected by an LMA inspector.

All new pilot(s) will need to complete the full test flight programme to be named on the permit to fly.

4.1 Summary of the Schemes

Since the inception of the LMA Proficiency Scheme to allow pilots to demonstrate their competence to fly large model aircraft at public displays, the scheme has been expanded to cover the minimum necessary theoretical competence to fly model aircraft of any size and also a basic proficiency to practically demonstrate an ability to fly model aircraft safely.

A pass of any of the Proficiency tests is recorded in the LMA membership system and shown the member's LMA membership document.

Examiners are appointed by the LMA based on their competence and ability to test the safe flying ability of members who have requested a Proficiency test. Proficiency tests can be carried out at any appropriate flying site or event, provided the paying public are not in attendance and with the agreement of the event organiser.

Basic and Full Proficiency tests can be carried out by Proficiency Examiners or any over 25kg scheme Inspector / Senior Inspector or Flight Test Witness.

Only LMA members who hold a Full Proficiency can fly at LMA organised public events.

Throughout it should be remembered that the aim of the Proficiency Scheme is to ensure that LMA members who fly have the legal minimum competency and are SAFE to fly.

4.2 Theoretical Proficiency

To allow demonstration of the required remote pilot competency for the LMA's operating authorisation, the Theoretical Proficiency has been introduced. The test consists of 40 multiple choice questions and has a pass mark of 75%.

The Theoretical Proficiency is now a pre-requisite for the Basic Proficiency and Full Proficiency practical flying tests.

The test is online on the LMA website here-

https://www.largemodelassociation.com/resources/theoretical-proficiency-test/

4.3 Basic Proficiency

The Basic Proficiency test was introduced to encourage the safe operation of Radio Control flying models. This test will not be applicable to flying models at public events - the LMA Full Proficiency exists for this purpose - but it is hoped that the Basic Proficiency test will raise standards for the operations at fly ins and at local club level with a practical demonstration of piloting competency.

The test is intended to be equivalent with the SAA Bronze & the BMFA A tests to demonstrate a basic level of practical ability and competence for flying model aircraft under the LMA Article 16 operating authorisation.

4.3.1 The Basic Proficiency Test

Before taking the test, you must have passed the LMA Theoretical Proficiency online test and produce proof to the examiner.

You must stand at the pilot's box throughout the flight and not stand behind the model during take off or fly behind yourself.

You may use a helper or use the examiner as a helper if needed. If a helper is used, you must fully brief the helper in the presence of the examiner, or brief the examiner on what they are required to do throughout the flight from start up to returning to the pits after landing.

The model can be of any type and power type, but must have a minimum MTOM of 1kg and be capable of taking off from the ground.

If the model is fitted with a flight stabilisation gyro, it must not be used during the test and either turned off or disconnected for the duration of the test.

You may elect to do either racetrack circuits or rectangular circuits, the type to be agreed with the examiner prior to the beginning of the test.

One circuit must be of the other type (racetrack or rectangular) and all circuits flown must be of a similar size.

If the examiner is unhappy with any individual manoeuvre (maximum of two manoeuvres per test) the examiner may ask you to repeat only the unsatisfactory manoeuvre(s). If all other elements were satisfactory and you have demonstrated the repeated element(s) to the examiner's satisfaction, the practical element will be deemed a pass.

You must demonstrate good, clear and concise communication with all others flying during the test.

If the model suffers a genuine "dead stick" during the test and the examiner is satisfied with how it was dealt with, element 7 need not be repeated and may be omitted.

You must pass both the theory questions and practical elements to achieve an overall pass.

Section A Pre-flight checks and Start Up Procedures

You must demonstrate pre-flight safety checks and model structural integrity during set-up. (correct security and operation of servos, control linkages, control surfaces, etc.)

Safe start up procedures must be demonstrated and the helper used correctly if applicable. The model must be suitably secured/restrained and pointed into a safe area at all times and any loose clothing, neck straps, etc, kept clear of the propeller arc.

Section B Takeoff and first circuit

The model should be taxied out to the runway centre line and turned into wind or placed on the centre line pointing into wind by the helper. The take off run should start level with the pilot's box.

The throttle should be opened smoothly and progressively, and the model should track down the runway centreline with any deviation corrected by appropriate use of the rudder. At no time should the model be allowed to deviate significantly from the runway heading without rapid intervention and correction; if so, the take off must be aborted.

The model should climb out smoothly and turn onto the crosswind leg, fly down wind and turn onto the base leg. The model should then turn to overfly the runway at a height of approx. 15.25m (50ft) into wind.

Section C Figure of eight

You may elect to do an extended figure of eight or a circular figure of eight, to be agreed with the examiner prior to the beginning of the test. Both halves of the figure of eight must be the same, either circular or extended.

Extended Figure of Eight

At the end of the upwind leg, a continuous turn away from the runway line of approximately 200 degrees should be made and the model should finish the turn on a heading approximately 30 degrees towards the downwind end of the runway. At the end of the downwind leg, another continuous 200 degree turn away from the runway line should be made and the model should finish the turn on a heading approximately 30 degrees towards the upwind wind end of the runway. The manoeuvre is completed when the model reaches the upwind end of the runway and passes the start point.

Circular figure of eight

The upwind and downwind circles should be of similar sizes and the crossover point in front of you.

No matter which type of figure of eight is completed, the model should remain at a constant height throughout.

Section D Procedure turn and opposite direction circuit

At the end of the figure of eight, the model should be turned 90 degrees away from the runway, then immediately banked through 270 degrees back onto the runway line for a downwind circuit. There should be no straight sections in the procedure turn and flown at a constant height.

The circuit should be flown at a constant height in the opposite direction to the first circuit.

Section E Procedure turn and climbing circuit

At the downwind end of the circuit, the model should be turned 90 degrees away from the runway line, then immediately banked through 270 degrees back onto the runway line. There should be no straight sections in the procedure turn and it should be of a similar size to the upwind procedure turn and flown at a constant height.

The model should enter and complete a climbing circuit, doubling the altitude to 30.5m (100ft). The climb should be gradual, taking the full circuit to achieve and finishing level you heading into wind.

Section F Simulated deadstick landing in pre-defined area

A simulated dead stick landing will be demonstrated on the examiners command, as if the engine had cut during the flight. Appropriate communication with other pilots in the pilots box must be apparent to the examiner. With the engine at idle or electric motor off, you will need to demonstrate a safe return to the runway. If it becomes apparent that the model would not make the runway, power should be reapplied to prevent loss of the model.

Section G Takeoff in relation to wind, circuit and powered landing in pre-defined area

If the simulated deadstick landing has been completed to the examiner's satisfaction they will ask you to take off, perform a circuit and land under power.

The model can be repositioned on the runway before takeoff if necessary.

If the engine has stopped the model should be retrieved from the runway and restarted before continuing.

Section H Practical knowledge

You will need to answer five questions on model flying and safe operations from the question bank that is provided to examiners.

The completed test form will be sent to the Chief Inspector who will then pass it to the Membership Secretary to update your membership record. If you have passed the test, then your membership document will be annotated accordingly with the examiners signature and the date of the test. This is a temporary measure as you will be issued with a revised LMA membership document indicating that you are now a holder of the Basic Proficiency.

4.4 The Full Proficiency

The Full Proficiency is the minimum standard needed to fly model aircraft at any LMA organised public event.

Although there are many similarities with the Basic Proficiency, a higher standard of general flying ability, along with the ability to work with a helper and fly safely in relation to an imaginary crowd are required for the Full Proficiency.

4.4.1 The Full Proficiency Test

You will be asked to produce your current LMA membership document and evidence of a Theoretical Proficiency pass. The test needs to be carried out with a model weighing at least 7.5kg.

You will be advised that it is reasonable for the test to be conducted whilst other aircraft are in the air as this helps to give the Examiner a better indication of the flying skill that would be demonstrated in this context at public displays.

It will also be emphasised that whilst it would not be considered acceptable to do the test in extreme flying conditions there should be no attempt to postpone the test because the conditions are not perfect on the day – this type of situation may well occur on public show days.

It is essential for you to ensure that your helper is an integral part of the test and your ability of working with your helper as a team will be a measured as part of the testing procedure. In other words, the helpers' duties are not completed after starting, but remain an important feature of the whole process. You will be asked to comment about this relationship in your remarks about the test.

Section A Structural Integrity of the model – Preparation and Start up procedures

You will be asked to conduct a pre-flight inspection, check the failsafe for correct functioning and explain to the Examiner what aspects you feel are important about the pre-flight inspection as you carry out this process.

The examiner will observe the engine starting / arming procedure with particular regard to safe procedures. This should include the position of other persons present. The examiner will also monitor the relationship with your helper during these procedures.

The examiner will observe how you ensure that the power plant is operating safely at all power settings.

The examiner will observe you checking in the general flying area for safety before taxiing out to the take off position and confirming with other pilots before doing so that it is safe to take off.

You will need to demonstrate that you have a clear knowledge of the take off direction and circuit pattern. Up to the take off point he will expect that the model will be restrained at all times by your helper.

Section B Standard Take off in relation to the wind and starting the test in the air

The examiner will ensure that you are capable of taking off safely in the wind conditions with you stood in the designated 'pilots box' and not when you are standing behind the model. Takeoff should be accomplished in relation to an imaginary crowd line.

After take off, the climb out and first turn will be observed as to safety, with the possible need to make an early first turn relatively to avoid infringing the 30m imaginary crowd line.

Section C Quality of the flying at various heights, adherence to display line parameters and simulated wind directions

The examiner will test your ability to display the aircraft to the crowd at different heights and speeds without encroaching over the imaginary 50m display line and, as far as possible, without making turns towards the crowd line. You should be able to make relatively tight turns without losing height and should be able to fly 'figures of eight' in front of yourself without significant loss or gain of altitude.

Section D Response to imaginary Emergency procedures

During a simulated emergency you will be asked to recover control of the model but you will not be required to do anything by the examiner which would cause a hazard to your model. However, it is reasonable to expect that you should be able to recover quickly and safely from a stall.

If the model is appropriate the examiner will test your ability to recover quickly and accurately from a spin.

Common sense will be used in this section of the test - the type of model is important and no candidate will be asked to do anything which is not within the reasonable capability of the model or which would put it at risk.

The examiner will also test your ability to cope with an unexpected situation, without endangering the model or the crowd.

For instance, the wind has changed through 90 degrees so how, if at all, will you change your landing approach.

You will also be tested on your ability to deal with an engine failure, or a loss of power output. You will be expected to make use of your helper to call a warning to other pilots and to the flight line director so that you can make a safe landing approach.

Circumstances will dictate where this might be, if the model is too low to carry out a safe turn and land into wind you may be expected to take the safer option and land downwind. It is up to the examiner to test your safe decision making on this matter. In all circumstances you be judged on quick, decisive, and safe action in relation to the presence of the public.

Section E Quality of the approach, go around, and landing

On the landing approach towards the end of the test the examiner might instruct you to go around. On setting up this test the examiner will not make unfair demands or do anything which may put a model or person at risk.

You must show that you can judge the distance of the model and its approach path. You should also be prepared to enlist the assistance of your helper with the lining up on final approach, and in warning others of the landing approach.

You will be expected to be able to land from the left or from the right and demonstrate that you can cope with adverse wind conditions including cross wind conditions.

After landing you will be expected to clear the runway and stop the engine in a safe area. You should demonstrate that you are aware of the need to clear the runway for other aircraft as rapidly as possible and to taxi to a safe position where your helper can safely retrieve the aircraft

Section F General impression of airmanship and team work with helper

The examiner will give feedback on the way you reacted with other fliers during the test and how much use you made of your helper in ensuring that a high standard of airmanship was maintained throughout the whole of the test.

Section G Oral Examination

You will be asked a range of questions from the Full Proficiency Required Knowledge document that is provided to the Examiner. It is not considered that you will fail the whole test simply upon some minor mistakes in your replies to his questions provided your practical operating and flying ability meets the required standard. The aim is to ensure that you have all round knowledge about large model operations and if you are not up to an acceptable standard then it may be necessary to spend a little time filling in some of the knowledge gaps.

Questions in the Full Proficiency Required Knowledge document cover, among others, the following aspects:-

- Knowledge and skills required for the building, maintenance and operation of Large Models
- Scrutineering procedures at Public Events

- Public Event regulations, procedures, and Safety Distances

Section H Follow Up Action

The completed test form will be sent to the Chief Inspector who will then pass it to the Membership Secretary to update your membership record. If you have passed the test, then your membership document will be annotated accordingly with the examiners signature and the date of the test. This is a temporary measure as you will be issued with a revised LMA membership document indicating that you are now a holder of the Full Proficiency.

5.1 Events and Flying Displays

Anyone organising a model aircraft flying display (whether it's a public event or a private event) now needs permission from the operational authorisation holder to enable model aircraft to be flown. For model aircraft up to 25kg, that can be either the BMFA or the LMA, but for model aircraft over 25kg the permission of the LMA is required. The permission can also increase the height limit for model aircraft over 7.5kg from 400ft and modify the minimum separation distance for model aircraft over 25kg from assemblies of people during the display.

A model aircraft flying display is defined as-

> Any flying activity deliberately performed, by model aircraft, for the purpose of providing an exhibition or entertainment at an advertised event.

The display does not need to be open to the public or have an entry fee, if it is a deliberately planned display permission is needed. Practicing a display routine or holding a flyin that happens to be watched by passing dog walker(s) does not constitute a display.

There are 6 defined tiers of event involving model aircraft, depending on the type of activity, size of the aircraft and the maximum height of the flying activity. The following criteria identify the additional permission (if any) that is needed-

Tier 1

A Contest / Event (not a Display) using model aircraft < 7.5Kg

Flown to local site rules under Article 16 operating authorisation.

Tier 2

A Contest / Event (not a Display) using model aircraft >7.5Kg but <25Kg >400ft

Requires an LMA Site Permit and a NOTAM (if a 'one off') unless flown on a site with an existing LMA Site Permit.

(May be combined with a BMFA Site Permit to cover model aircraft >7.5Kg but <25Kg >400ft)

Tier 3

A Contest / Event (not a Display) using model aircraft >25Kg >400ft

Requires an LMA Site Permit and a NOTAM (if a 'one off') unless flown on a site with an existing LMA Site Permit.

(May be combined with a BMFA Site Permit to cover model aircraft >7.5Kg but <25Kg >400ft)

Tier 4

A Display featuring model aircraft >7.5Kg but <25Kg

Requires an LMA Display Permit (which may permit aircraft >7.5Kg but <25Kg >400ft) and a NOTAM.

(May be combined with a BMFA Display Permit to cover model aircraft >7.5Kg but <25Kg >400ft)

Tier 5

A Display featuring Large Model Aircraft >25Kg

Requires an LMA Display Permit (which may permit >25kg >400ft) and a NOTAM.

(May be combined with a BMFA Display Permit to cover model aircraft >7.5Kg but <25Kg >400ft)

Tier 6

A Display featuring Large Model Aircraft >25Kg and manned aircraft

Requires an LMA Display Permit (which may permit >25kg >400ft) and a NOTAM.

(May be combined with a BMFA Display Permit to cover model aircraft >7.5Kg but <25Kg >400ft)

If a Permit for a model event in Tiers 2 or 3 is needed, an application should be made to secretary@largemodelassociation.com in accordance with the LMA Large Model Aircraft Regular Flight Over 400ft Review and Oversight Process.

If a Permit for a model aircraft flying display in Tiers 4, 5 or 6 is needed, an application should be made to secretary@largemodelassociation.com in accordance with the LMA Model Aircraft Flying Display Review and Oversight Process.

5.2 Model Aircraft Flying Display Requirements and Organisation

The following section is a summary of the requirements for LMA permissions for model flying displays and includes guidance on how to safely organise and run a model flying display for radio controlled model aircraft.

For an event where the public will be in attendance, the full event needs to be planned, and the guidance given at https://www.hse.gov.uk/event-safety/ will be useful.

If more detailed information is needed, please contact secretary@largemodelassociation.com

5.2.1 Operational Personnel

It is the responsibility of the organiser of the model aircraft flying display to ensure that it is carried out safely. As the organiser may be an individual or a company / club, at least one nominated person is required to be the person with overall responsibility for the safe model flying activity. The nominated person may be either the Model Flying Display Organiser (MFDO) or Model Flying Display Director (MFDD)

Model Flying Display Organiser (MFDO) – The person with overall responsibility for the entire display event

Model Flying Display Director (MFDD) – The person with the responsibility for the model aircraft flying at the event

If the display is part of a manned aircraft flying display, the Display Organiser (DO) and Flying Display Director (FDD) will have overall responsibility for entire display, and the model flying part of the display may be under the responsibility of the Model Flying Display Director.

It is a requirement of the LMA permission that at least one authorised person is physically on site whenever model aircraft

are being flown during the display. For that reason, it is strongly recommended for all but the very smallest displays to have at least two nominated persons in case of unforeseen circumstances.

The LMA will need to be satisfied that the MFDO / MFDD is a person who is fit and competent to carry out the role, having regard in particular to their previous conduct and experience.

To show that the display organiser has the organisation, staffing and other arrangements, to safely organise and operate the proposed Flying Display, event risk assessment(s) must be carried out and should show how the required roles and required minimum numbers of personnel required have been determined. It is not necessary to name the personnel, but the criteria used to determine their suitability for their assigned role should be defined.

It is likely that in all but the smallest displays several Flight Line Marshals will be required, who will be directly responsible to the MFDD to oversee all of the flying activity, including aircraft engine running on the ground

It is recommended that all personnel involved with running a model flying display have an LMA Full Proficiency, BMFA B or equivalent proven experience to understand and carry out the scope of their role.

For a small display involving one aircraft, the remote pilot may also be the event organiser and require no other personnel in addition to the Pilot's helper.

5.2.2 Model Flying Display Risk Assessment

To allow a full view of the risks of the display to be considered, a risk assessment should be carried out.

The aim of the risk assessment is not just a 'tick box' requirement to be met, but to make sure that all foreseeable risks have been considered and mitigated if necessary.

An initial risk assessment should be carried out at the beginning of the planning process and reviewed when planning is complete to ensure all pertinent risks have been identified and mitigated if necessary.

The Flying Display risk assessment(s) should be carried out in accordance with CAP403 Appendix I or using the template provided in Appendix 2 of this Handbook, and cover as a minimum-

- Normal Operations
  - The suitability of the display location
  - Model aircraft airworthiness
  - Model aircraft separation distances
  - Model aircraft transmitter control / frequency control
  - Remote pilot competence and fitness
  - Operational personnel positions and competence
  - Additional separation distance for model aircraft of exceptional dimensions, weight or performance
  - Additional controls / limitations for pyrotechnic displays as part of

the model flying display (if applicable)
  - Additional controls / limitations for night displays (if applicable)
- Emergencies
  - A breach of any separation distance
  - Flight outside the defined display area
  - A model aircraft crash in the 'live' side
  - A model aircraft crash in the 'dead' side
  - Mandatory reports to the AAIB
  - Mandatory reports to the CAA
  - Mandatory reports to the LMA (and if applicable the BMFA

5.2.3 Model Flying Display Site Assessment

The site planned to be used for the display must be assessed to determine the suitability of the site and the display area for the operation of model aircraft, and if applicable, large model aircraft in accordance with Section 3.4.

Throughout this section of the Handbook, there are two defined areas relating to the flying of model aircraft, which are usually delineated by the fence/ barrier that separates the two areas.

Live Side - The areas that the model aircraft are permitted to be flown and operated within

Dead Side - The areas that model aircraft are not permitted to be flown and operated within

All uninvolved people and assemblies of people (the audience for the display) are only permitted to be located on the Dead Side of the display.

Care should be taken to prevent people congregating on the Live Side of the display, as they would then become an assembly of people and require all model aircraft in flight to maintain a minimum separation from them.

If the site is within an FRZ, the airfield operator must be involved at an early stage in planning, as their permission will be required for any flying to take place.

The proposed venue for the display must allow the following minimum separation distances to be met at all times during the model flying display.

1. The Separation Distances between Spectators and model aircraft must be maintained whether they are flown in a specified area or on the display side of the Crowd Line.
2. The Minimum Separation Distance for model aircraft of 7.5 kg and under is 30 metres. For model aircraft over 7.5 kg the Minimum Separation Distance is 50 metres, but this distance may be reduced to 30 metres for take-off and landing only.
3. For model aircraft of over 25kg, and all gas turbine and pulse jet powered model aircraft, a greater Minimum Separation Distance of 75 metres is required. This distance may be reduced to 30 metres or 50 metres for take-off and landing only and to 50m for slow passes only.
4. The Display Organiser and MFDD should also consider the need to add an additional separation distance for model aircraft of

exceptional dimensions, mass or performance.

In addition, the site must allow all model aircraft to remain within visual line of sight of the remote pilot at all times during the display flights.

Consideration must be given to the presence of any third-party property within the display area that may be damaged by a model crash. The defined display area may be restricted at the time of the display depending on the state of the weather, or the condition of any crops within the display area at the discretion of the Event Director or Flight Line Safety Officer.

5.2.3.1 Take off and Landing at Reduced Separation Distance of 30m or 50m

A request may be made during the application process to permit a reduction in the 75m separation distance to either 50m or 30m for model aircraft either over 25kg or gas turbine and pulse jet powered.

To support the request, an additional risk assessment will be required to cover the additional risks associated with the aircraft flying closer to the crowd.

The risk assessment must cover as a minimum-

- Type and suitability of crowd barrier
- Site layout including the location of runway(s) and crowd barrier(s)
- Additional physical barriers
- Weather conditions
- Aircraft types
- Pilot experience
- Startup, takeoff and landing marshalling

The control measures that are put in place depend on the layout of the display site and the types of aircraft being flown.

The weather conditions, especially crosswind should be taken into account when planning the layout of the event, and monitored throughout the display.

Section 5.4 gives guidance on how to assess the strength of the crosswind.

If the minimum separation distance of 30m is requested, serious consideration should be given to a more substantial crowd barrier (metal or wood & metal), at least in the area(s) where an aircraft may potentially reach the crowd barrier.

Consideration should also be given to changing the takeoff and landing distance depending on weather conditions at the time-

- Minimum requested separation distance if weather is benign
- Increased separation distance if weather is not favourable

The distances to be used and criteria for altering them need to be listed in the display risk assessment.

Operators and pilots must only fly if they are fully confident that the aircraft is suitable for the conditions and the pilot can handle the aircraft in the conditions.

Display organisers must be robust in determining whether operators & pilots are flying within their and the aircraft's limits, and must be covered in the pilots briefing.

If the display organiser is not confident that the pilot will be flying within their and the aircraft's limits, it is their responsibility to stop the aircraft from flying.

Measures should be in place to minimise the chance of aircraft colliding during takeoff and landing by effective marshalling. Formation takeoffs should be only carried out where previously practiced. Aircraft must not be carrying out slow passes at 50m while other aircraft are taking off or landing.

Consideration can also be given to having additional fencing along the side of the runway in the highest risk locations to catch any aircraft leaving the runway in the direction of the crowd. These fences should also protect participants in the pits areas.

The number of people on the live side of the crowd line in the pits area should be kept to a minimum, especially in the areas in highest risk of an aircraft departing the runway, and should not be a spectator area for families and friends.

Participants should be briefed on the importance of keeping a good lookout, either themselves or via a helper when they are in the pits area.

When operators and pilots are not flying, they should be given a briefing and guidance on maintaining a good lookout for aircraft at all times when flying is taking place, as when in the pits area they are closest to any aircraft that may be heading towards the crowd.

All aircraft must be restrained when they are being started, the engine(s) running or are being taxied closer to the crowd than the minimum separation distance.

5.2.3.2 Slow Passes at Reduced Separation Distance of 50m

Where a reduced separation distance of 50 or 30m for takeoff and landing has been permitted, slow passes may be made at a reduced separation distance of 50m with turbine powered and over 25kg aircraft.

There is no defined speed for 'slow', but the pass must be slow for that aircraft, and at approximately landing approach speed, but not so slow that loss of control / stall is a significant risk.

Slow passes should be carried out lower than normal circuit height and properly communicated to all pilots flying at the time, and no passes should be carried out when other aircraft are taking off or landing.

Hovering cannot be carried out at the reduced separation distances, as experience has shown that even a momentary loss of pilot concentration / orientation can lead to the aircraft departing the hover in any direction.

5.2.4 Display Planning and Site Layout

5.2.4.1 Health & Safety

The guidance given on the Health & Safety Executive webpage 'Running an event safely' should be followed, and sufficient qualified first aiders should be on site throughout the event.

A fire risk assessment should be carried out in accordance with the Government 'Fire safety risk assessment: open-air events and venues' and will identify any specific fire-related mitigations necessary.

It is also important to have registered the event with the local authority Safety Advisory Group, who will be able to assist with the planning and ensure that the relevant emergency services are aware of the event and the emergency plan.

5.2.4.2 Personnel

The event risk assessment should be used to identify the personnel required to safely run the event, and the number of people carrying out each role. Don't forget to factor in breaks for all personnel.

All personnel should be in radio contact to enable smooth running of the display and also deal with any emergencies effectively. The noise of running engines should be considered when selecting a radio system.

If necessary, specific radio callsigns should be assigned for personnel and emergency code words should be identified in the event communications plan.

At larger events, separate channels should be used for different areas of the event to prevent important safety messages being delayed or blocked by general radio chatter. At least one person should have access to all radio channels in use to relay safety messages between groups and areas of the event.

Briefings of all personnel involved in the display should be held before the display each day to ensure that all personnel are fully conversant with the display programme, the plans and procedures in place and after the display each day to ensure that any issues are identified and rectified as soon as possible.

5.2.4.3 Commentary / Public Announcements

For events where the spectators are too many to be shouted at, a public address system capable of being heard by the whole crowd should be in place and operational during the flying display. A commentator should also be on duty throughout the display to provide information on the display, but most importantly to make announcements to the crowd in case of an emergency. To enable this, the duty commentator should be in radio communication with the MFDD to enable announcements to be made when required.

5.2.4.4 Public Address Announcements

In case of an incident during the display, the commentator should make announcements to inform the crowd of what is happening and reassure them that the situation is under control.

Suggested scripted announcements for example incidents are given below, but as part of the risk assessment process, scenarios should be identified, and relevant announcements planned.

Manned Aircraft or Model Aircraft Crash Not Involving The Public

> "You will have seen what has just happened, please remain where you are as there is nothing you can do. Please keep clear of all Emergency Vehicles, do not attempt to move your cars.
>
> You will be informed about the continuance or otherwise of the display and any news about the incident as we receive it. Thank you for your co-operation".

Manned Aircraft Or Model Crash Involving The Public

"Ladies and gentlemen, rescue services are dealing with the situation. Please stay away from the accident area and to not touch or remove anything you may find. You will be kept informed about the progress. Do not attempt to remove your cars as this will hinder the rescue vehicles.

You will be informed about the continuance or otherwise of the display and any news about the incident as we receive it. Thank you for your co-operation".

5.2.4.5 Layout Of The Display Site

Depending on the site layout, spectator barriers should be sited parallel to the intended runway(s) and at a minimum of 30m from the runway edge to keep all spectators the required separation distance for aircraft in flight.

Spectator barriers must form a complete barrier to stop children especially from being able to walk under them, and not just be a single line of rope on posts. Plastic mesh fencing should be used as a minimum and metal barriers should be used if large crowds are expected.

Appropriate Controls should be in place to prevent spectators from crossing the barrier line and ensure that only the necessary involved people have access to the Live Side of the display site, such as guarded access points and patrols of the complete spectator barrier. Participants should be strongly discouraged from climbing over barriers and accessing the Live Side anywhere other than the provided gates / access points.

5.2.4.6 Pits Area

A designated place in which model aircraft are parked and displayed while not being flown should be defined, with sufficient space for all the aircraft that will need to use it during the display. The pits area will normally be on the 'dead side' of the crowd barrier, but may not be depending on the site layout.

The number of people in the pits should be kept to a minimum, and if the pits are on the 'live side' of the crowd barrier, it is the responsibility of the operator of each aircraft to ensure any guests / helpers are sufficiently briefed of the operation and inherent risks to make them 'involved', and that they are monitored if necessary.

A method of securing and controlling access to the pits area should be in place to prevent spectators from damaging any aircraft, with sufficient personnel available to make the control effective.

This area is laid out in such a manner that the static models are well displayed to the public. This is often achieved along the front of the public safety barrier line and the models should be displayed to a depth of no more than one model or they may be in a special display compound properly safeguarded by fencing with a single entrance for spectator control. In the latter circumstances the display area will be situated on the spectator side of the crowd barrier and not the live side. The public can be allowed access to the live side for viewing of the model aircraft, but all members of the public allowed into this area for this purpose must be given a safety briefing and accompanied and supervised at all times by LMA personnel.

It is recommended that refuelling should only be permitted in the pits or specified areas with controls in place to contain any fuel spills and contain any fire, and controls should be in place of battery charging to contain any fire.

5.2.4.7 Start-Up Box

A designated place in which engines are allowed to be started and run before flight should be defined, with sufficient space for all the aircraft that will need to use it for a single display.

It is recommended that running of engines is not permitted anywhere else in the pits area, and sufficient fire extinguishers are provided in the start-up box for the type of model aircraft being operated.

5.2.4.8 Pilots Box

A designed place for all the remote pilots to stand while flying their aircraft should be defined with sufficient space for all remote pilots to be accompanied by their authorised helper or safety pilot and any organising personnel.

A suitable safety barrier to protect the remote pilots from an aircraft loss of control on takeoff or during landing is recommended.

It is recommended that all remote pilots must conduct their entire flight while physically stood in the pilots box, including takeoff and landing.

Transmitters should not be taken onto the active runway at any time.

5.2.5 Display Planning and Operation

5.2.5.1 Remote Pilot Competency, Fitness and Currency

It is a requirement of the Article 16 authorisation that all remote pilots only fly model aircraft when they are fit, sufficiently awake and not drunk or on drugs.

It is strongly recommended that only pre-booked and approved remote pilots may fly at a display to give the event organiser sufficient time to check the pilot's practical competence if necessary.

The event organiser should have a means to check that the remote pilot is fit to fly, and a self-declaration of fitness by every pilot on every day they are scheduled to fly may be used.

The display organiser should satisfy themselves that all remote pilots are practically competent to fly the aircraft they are scheduled to fly in the display. An existing demonstration of competency such as an LMA Full Proficiency, BMFA B or similar may be used or an alternative means defined by the event organiser.

The event organiser should have a means to check that the remote pilot has the required pilot currency, and a self-declaration of currency by every pilot on every day they are scheduled to fly may be used.

Model aircraft over 25kg may only be flown by the remote pilot(s) named on the aircraft's authorisation or permit to fly.

5.2.5.2 Display Operator & Pilot Booking and Checkin

It is the responsibility of every model aircraft display event organiser to ensure that the display is carried out safely, and that-

- Operators are appropriately registered and are complying with their responsibilities as per the relevant Article 16 authorisations
- Remote pilots have the necessary theoretical and practical competence and are complying with their responsibilities as per the relevant Article 16 authorisations

This can be achieved in several ways-

- A self-declaration from each operator and remote pilot that they are complying with their legal duties with a check of approximately 10% of pilot & operator details carried out and recorded to confirm that everyone is complying
- Asking each operator and remote pilot to provide their membership and registration information, with a check of all details carried out to confirm that everyone is complying

In good time before the event, all the display participants should be sent the check in form to allow them to complete it before they arrive. This will help prevent long queues when checking in attendees.

All participants should be checked in before they are permitted to fly at your event, with some mechanism (flightline pass, wristband etc.) to show that they have been checked in.

It is recommended to keep a record of who is flying what aircraft on each day of a display. A complaint or claim may not arrive straight away after a display, and it is good to have evidence of what aircraft were actually taking part in your display on each day.

In many cases the operator and pilot are the same person, but with 'show' type aircraft, there are builders / operators who do not fly the aircraft themselves. It is important to collect information / declarations from both operators and pilots-

- The aircraft operator, and their compliance with their operator responsibilities
- The aircraft remote pilot, and their compliance with their pilot responsibilities

If it is intended to collect and record information such as-

- BMFA membership number
- LMA membership number
- Operator ID
- Flier ID

then there must be a mechanism of checking and recording that the information given is correct. Asking all participants to show their LMA / BMFA membership record or CAA DMARES record will show the relevant information and allow check in staff to check and record the information has been seen.

5.2.5.3 Model Aircraft Airworthiness

It is the responsibility of the model aircraft's operator to maintain and repair the aircraft and keep it in an airworthy condition and is safe to fly.

It is the responsibility of the remote pilot to only fly an aircraft that is in a safe condition to complete the flight safely.

The display organiser should satisfy themselves that all model aircraft scheduled to fly in the display are in a safe and airworthy condition. A self-declaration by the operator and remote pilot each day may be used, a physical 'scrutineering' inspection may be carried out or an alternative means may be defined by the event organiser.

No matter what method is used to ensure overall aircraft airworthiness, it is recommended that the display organiser carries out and records the result of a physical verification of the 'failsafe' function of every model aircraft before it is flown on every day it is scheduled to fly.

Model aircraft over 25kg may only be flown if they have a valid Full Authorisation issued by the CAA or an LMA issued permit to fly.

5.2.5.4 Radio Frequency Control

Whenever radio controlled models are being flown, steps should be taken to minimise sources of competing radio traffic.

The vast majority of radio equipment available operates on 2.4GHz and while the systems automatically work together without interfering, significant other radio traffic on 2.4GHz can cause control problems and potential loss of control of a model aircraft if the additional traffic is severe enough.

As both Wi-Fi and Bluetooth operate on 2.4GHz, requiring all mobile phones to have as a minimum Wi-Fi and Bluetooth disabled when on the live side when flying is taking place should be seriously considered.

All operators & remote pilots should be encouraged to have their radio systems operating as little as possible during the display to minimise radio congestion.

35MHz is still legal for model flying, but due to the need for transmitter control and the loss of frequency control discipline since the introduction of 2.4GHz radios, 35MHz is not considered suitable for use in public displays.

Some radio systems operate on both 2.4GHz and 868MHz (commonly referred to as 900MHz) and FPV systems can also use 5.8GHz, and the same precautions should be used to prevent any control problems for model aircraft flying in the display.

Use of a spectrum analyser on the radio frequencies to be used should be considered to identify any potentially problematic radio traffic, but the results are very dependant on the type and location of the analyser antenna.

5.2.5.5 Night Displays

Displays that take place at night (officially defined as between 30 minutes after sunset and 30 minutes before sunrise at ground level) will require additional measures to ensure that sufficient lighting exists for the safe setup & starting of model aircraft, and sufficient lighting of the aircraft in flight to allow the pilot appropriate visual line of sight to maintain orientation and control at all times.

No remote pilot who has not flown at the site during the day should be allowed to fly at night, and only remote pilots who have previous experience of flying at night

should be scheduled to fly in the night display.

An increased separation distance from the crowd should be seriously considered for all night displays.

Additional personnel should be considered to run the night display, to prevent the display being run by the same personnel who have controlled the daytime display working while fatigued.

5.2.5.6 Pyrotechnic / Special Effects Displays

Where pyrotechnics are involved, either ground-based or fitted to model aircraft, their setup and use must be strictly controlled by a competent person who has responsibility for them. The use of professional contractors is strongly recommended.

Debris from pyrotechnics must not impinge on aircraft, spectators or cause any damage to the runway / taxiways, also the scale and maximum heights of any effects must be known before the event. Briefings for ground officials and remote pilots must draw attention to the hazardous nature of such devices and must include details of positioning and timings of detonations with respect of planned displays, communication, and emergency planning.

The effect of smoke from pyrotechnics on remote pilots' ability to see the aircraft they are flying in the display must be taken into account.

The pyrotechnics should be included in the event fire risk assessment to determine the fire mitigations that will be needed.

5.2.5.7 Model Aircraft Flying Outside Display Hours

All model aircraft flying at an event are under the responsibility of the MFDO/ MFDD even if carried out outside the formal display times, whether for pre-display test flights or general evening flying

All such flying must be carried out and controlled in the same location as the formal display flying, not anywhere else on the event site.

Additional personnel should be considered to run the out of hours flying, to prevent the display being run by the same personnel who have controlled the daytime display working while fatigued.

5.2.6 Model Flying Display Control & Operation

The flying display is controlled by the MFDD and the defined personnel who have the responsibility for ensuring the display is carried out safely.

Any breach of ground or flying rules, exhibition of poor airmanship or breach of minimum separation distances must be dealt with immediately by the MFDD or Flight Line Marshall and require the offending pilot to shut down their engine or to land the aircraft immediately depending on the phase of flight.

Once the aircraft is safely stopped or landed and made safe, the MFDD should decide whether to let the remote pilot involved continue in the display, and make any required occurrence reports.

The recommended weather limits for model aircraft flying are a minimum visibility of 500 metres and a maximum wind strength of 25kts. The degree of

crosswind, if any, may decrease the maximum event windspeed depending on the aircraft being flown.

5.2.6.1 Pre-Display Pilots Briefing

Prior to the flying display commencing each day the MFDO and MFDD must conduct a verbal briefing of all operators and remote pilots who will fly in the display. A remote pilot cannot fly in the display if they have not received the briefing, and if they could not attend the group briefing a separate briefing may be given.

The person giving the Briefing should introduce all personnel involved in running the flying display i.e. Flight Line Marshalls, Start Box Marshalls, and any other individual or group he feels necessary.

As a guide the Briefing should include as a minimum the following information-

1. Weather report, circuit direction, height limitation, restricted areas.
2. Information on Booking in and required documentation for operator and remote pilot responsibilities on each day of the display and what will be checked
3. Over 25kg aircraft specific requirements
4. Airworthiness of aircraft and what will be checked
5. Fail safe requirements and what will be checked
6. Location and use / orientation of Start Up boxes for propeller and turbine/jet powered aircraft if different
7. Any changes to the planned display programme
8. Location of Display Line, minimum separation distances and any visual aids used to mark distances and turning points
9. High energy manoeuvres
10. Slow passes
11. The extent of the flying area and any no-fly zones that may exist
12. How any infringements or unsafe flying will be dealt with
13. Pilots' helpers or safety pilots and their roles
14. Location of Flight Line fire fighting equipment
15. Procedure to recover aircraft crashed in the dead side
16. Procedure for crashed aircraft in the live side
17. Information on any manned aircraft involvement or possible incursion
18. Questions / comments from remote pilots flying in the display

The above is not a definitive list and other information may be included at the discretion of the MFDO or MFDD.

5.2.7 Flying in a Display

If you are a remote pilot, you are responsible for flying safely, complying with all the authorisations / permissions that are in place for the display and only flying at displays that have the appropriate authorisations and permissions in place.

If you are an operator, you are responsible for the airworthiness of the aircraft and ensuring the remote pilot is adequately briefed and competent.

In most cases the operator & remote pilot are the same person, but for larger model aircraft, it is more likely that the

operator and remote pilot are not the same person. In these cases, it is of great importance that both people fully understand their responsibilities. It is unlikely that the operator will be able to fully meet their responsibilities if they are not physically present whenever an aircraft is flown at a display.

You need a plan for what will occur in case you become incapacitated while flying during the display. It is recommended that the pilot's helper has sufficient competence and ability to as a minimum fly the aircraft to a forced landing within the defined display area.

If you are flying an over 25kg aircraft, any person who is competent and capable may take control in case of pilot incapacitation to steer the aircraft to a safe forced landing within the defined display area rather than leave the aircraft to potentially fly out of the display area.

5.2.7.1 Flying Reduced Take off and Landing Distances

If flying a jet powered or over 25kg aircraft at a display with a takeoff / landing distance reduced from 75m to 50m or 30m, you need to be aware of the display organisers' risk assessment, and what extra safety measures they have in place.

The wind strength and direction will be important, especially a crosswind.

You know the limits of both the aircraft and yourself as a pilot, and if you are not confident that the aircraft will be able to takeoff and land safely in the conditions, do not fly.

With a crosswind blowing from the crowd, there is a risk of the aircraft 'weathercocking' into wind and heading towards the crowd.

With a crosswind blowing towards the crowd, there is a risk of the aircraft being blown towards the crowd, especially on the final turn onto the landing approach. Tightening the turn can lead to a stall and crash, closer to the crowd.

If the layout of the site will allow takeoff and landing to be made into wind while maintaining minimum separation distances, that will reduce the effective crosswind, especially for WW1 and aircraft types with limited crosswind capability.

Before taking off, think about what you'll do if things don't fully go to plan.

Especially, have a plan for what to do in case the aircraft swings towards the crowd during takeoff or landing.

If the aircraft is flying and under control, carry on flying the aircraft and return immediately to land.

It is not permitted to fly over the crowd; however, in some limited cases, where the aircraft is in flight and heading towards the crowd line, it is the least-worst option to carry on and fly the aircraft. In those cases, cutting the throttle will cause the aircraft to crash into the crowd, so it is safer to fly over the crowd and return immediately to land or ditch the aircraft in a safe area.

If the aircraft is not fully under control, land the aircraft immediately, turning away from the crowd.

If the aircraft starts to veer significantly during the takeoff run, be decisive and stop before the aircraft is heading

towards the crowd or is travelling too fast to stop safely.

If there is a problem with the aircraft in flight that would increase the risk of leaving the runway towards the crowd line on landing, make the landing further out than normal, and consider ditching the aircraft in a safe area.

In all cases, 'land' means get the aircraft on the ground as quickly and as far away from anyone who may be harmed as possible. It does not mean save the aircraft.

When landing in windy or gusty conditions, a slightly faster than normal approach speed will allow the greater control to be retained during the landing approach.

You need to make sure that your helper physically restrains your aircraft while the engine is started and running, and until the aircraft is beyond the minimum distance from the crowd.

Make good use of your helper and the flight line marshals to ensure that the runway and airspace are clear before taking off or landing.

If it looks like there may be a collision between your aircraft and another aircraft, take decisive action to stop and avoid the collision.

Ultimately all model aircraft are disposable when compared to the safety of people.

5.2.7.2 Flying Slow Passes

If carrying out a slow pass with a turbine powered or over 25kg aircraft, depending on the type of aircraft and site layout, make sure you accelerate and climb out in good time and don't get caught at a low speed, low altitude / high drag condition at the end of the pass.

The pass should be at approximately landing approach speed for the aircraft, and at lower than normal circuit height and is a manoeuvre in itself, so should be flown as a landing approach, no rolls or loops or other aerobatic manoeuvres.

Do not carry out a 50m slow pass when other aircraft are taking off or landing.

5.2.7.3 Pilots Currency to Fly at a Display

It is a requirement that before flying in a display, you are current in your practical flying competence, the requirement being-

Any model aircraft pilot operating a 'large model aircraft', or a jet turbine powered model aircraft of any mass, for the purpose of a 'model aircraft flying display', must be able to demonstrate sufficient currency of pilot competence, by having flown as a minimum, three complete display routines, within the preceding 90 days of the 'model aircraft flying display', one of which must have been flown within the preceding 30 days, on an aircraft which is reasonably representative of the aircraft to be flown within the display event.

Although the formal requirement only applies to remote pilots of over 25kg and /or gas turbine powered aircraft, it is reasonable to expect that everyone flying any model aircraft at a display has at least this level of currency.

As very few people have a fixed 'display routine' to practice, flights of similar length and similar type of flying as you

would expect to do at the display will be sufficient. If you fly in a team, you don't have to do your 'currency' flights with the team, but if flying a close formation or 'synchronised' display, you should be current in that type of flying.

You know how your 'display' aircraft fly and handle (e.g. fast and twitchy or slow and ponderous) so it is up to you to be able to justify if needed how the aircraft you carry out practice flights are 'reasonably representative'. If you fly multiple aircraft in a display, you will need to be able to justify how you are current on each aircraft you fly.

At a display it is likely that you will need to self-declare you are current, but as there are no mandatory logbooks for flying model aircraft, it will be up to you to be able to prove if necessary that you have actually met the minimum currency requirements.

The most important thing is to have flown outside on a real aeroplane, not a simulator.

5.2.7.4 Pilot's Helper

Every remote pilot should have a helper / spotter with them when they fly. The main task of the helper is to act as an additional set of eyes and ears for the remote pilot, and the remote pilot must ensure that they are fully briefed and understand their responsibilities. The event organiser should consider whether a minimum competency requirement for pilot's helpers is required.

5.3 Occurrence Reporting

The reporting requirement in section 2.2.6 apply, and in addition a crash or landing of any model aircraft involved in the flying display in the designated spectator area must be reported to the AAIB immediately on 01252 512299 before the aircraft is moved. A report to the LMA Secretary must also be made immediately on 07791 278292.

5.4 Crosswinds

The following guide is based on consistent wind direction and speed and give the angular difference of increasing crosswind strength between the runway or proposed take-off / landing heading and the wind. No allowance is made in the following for a variable component or gusting.

Approximate crosswind strength as a percentage of full wind speed:

- Wind directly from the heading = full wind strength
- Wind ten degrees off the heading = 16% of full wind strength
- Wind twenty degrees off the heading = 33% of full wind strength
- Wind thirty degrees off the heading = 50 % of full wind strength
- Wind forty degrees off the heading = 66% of full wind strength
- Wind fifty degrees off the heading = 83% of full wind strength
- Wind sixty degrees off the heading = 100% of full wind strength

Angular differences beyond this should be taken as full wind strength crosswind.

The crosswind limit for safe flying will vary between different aircraft types and the experience of the pilot with that aircraft. If in doubt, do not fly.

6.1 Flying sites for flight over 400ft of models over 7.5kg

Sites that have the need to allow model aircraft over 7.5kg and over 25kg to fly above 400ft either permanently, occasionally or on a one-off basis will need permission from the LMA to enable the operations above 400ft.

If a Permit for a model flying site is needed, an application should be made on the LMA website

https://www.largemodelassociation.com/resources/article16/over-400ft-flying-site-permission-application/

in accordance with the LMA Large Model Aircraft Regular Flight Over 400ft Review and Oversight Process.

6.1.1 Operational Responsibilities

It is the responsibility of the model aircraft flying club to ensure that operations of model aircraft over 400ft are carried out safely.

To show that the model flying club can appropriately manage the operation, a safety case needs to be written to outline how the operation will be carried out safely and who in the club is responsible for ensuring the safe operation of large model aircraft over 400ft.

The safety case should also identify how remote pilots are qualified by having the knowledge, experience, competence, skill, physical and mental fitness to fly in accordance with the permission.

All members of the club who could operate or fly large model aircraft over 400ft should be aware of the processes, limitations and any safety mitigations that are in place.

6.1.2 Location Requirements

The flying site for which the request is being made must be an established model aircraft flying site, suitable for operation of large model aircraft in accordance with the LMA Handbook section 3.4.

When considering whether to request permission to operate large model aircraft over 400ft, air charts should be studied to see what type of airspace is above the site. The site should not be in a location that would lead to frequent proximity with manned aircraft (such as under a low-level corridor, in a 'pinch point' between blocks of controlled airspace or in an area of intense low-level manned aircraft activity.

The site may be within the FRZ of an aerodrome, provided that the appropriate permission from the airfield operator / ATC has been gained and adequate procedures are in place to maintain separation between manned aircraft and large model aircraft operating above 400ft.

If a large model aircraft goes into failsafe or suffers another type of failure when flying above 400ft, the distance it can potentially travel is increased. The area surrounding the defined flying area should be assessed to see if a model aircraft entering failsafe at the maximum height & extent of the flying area could potentially cause a hazard to uninvolved people on it's expected trajectory. If a hazard could be caused, the flying area should be moved / restricted as necessary.

If a club has more than one flying site, an application may be made for each flying site if the site can be justified for flight over 400ft.

Flying sites that are established but are only used for model aircraft flying on specific dates throughout the year or one off flying events can also be approved. These sites will not be entered into the AIP however and the following additional requirements apply-

1.The responsible person must notify the LMA of the dates that the site will be used for flying model aircraft over 7.5kg over 400ft

2.The responsible person must ensure that a NOTAM is in place for the entire duration of the model flying activity and active during the times that model aircraft are being flown.

6.1.3 Flying over 400ft with Large Model Aircraft

It is strongly recommended not to fly alone when operating above 400ft, and the site permit conditions may require the presence of a spotter. A spotter should be employed to act as another set of eyes and ears to aid the pilot in identifying any manned aircraft that may enter the flying area. The site flying rules should specify what the requirements are and how many people are needed to safely fly above 400ft.

6.1.4 AIP Entry / NOTAM

For sites that are accepted and granted a permission and are permanent model flying sites, the LMA will request that the site is added to the AIP as a site where large model aircraft are flown above 400ft. If the permission is not renewed annually, the LMA will request that the site is removed from the AIP. If the application is made by a BMFA affiliated club and has a permission from the BMFA for aircraft under 25kg, the entry in the AIP will be managed by the BMFA.

It must be remembered that an entry in the AIP or a NOTAM only alerts other airspace users of the model flying activity, it does not give exclusive access to the airspace, and it cannot be guaranteed that everyone has read or understood the notice.

Having a notice in place for a site when model flying is not taking place may also have the effect of leading regular users of the airspace to ignore the ‘nuisance’ notice and potentially fly through the area when model aircraft are actually being flown above 400ft.

Model Aircraft Article 16 Authorisation UAS13534 can be read in full on the LMA website under the Resources menu.

The definitions given in the Article 16 authorisation Appendix 1 are-

1) Assemblies of People:

Gatherings where persons are unable to move away due to the density of the people present.

2) Automated model aircraft:

A model aircraft with autonomous or automatic flight capability. This does not include systems which are fitted for flight stabilisation purposes or flight termination purposes, such as free-flight termination devices.

3) Built-Up Area:

An area substantially used for industrial, recreational, commercial or residential purposes.

4) Control Line model aircraft:

A model aircraft that is controlled in flight by one or more lines, attached to a handle, that work the required flight functions. The aircraft is connected to the remote pilot by these lines and so its flight is constrained to the surface of a hemisphere around the remote pilot with a radius equal to the length of the lines.

5) First Person View (FPV):

In First Person View operations the remote pilot flies the aircraft using images provided by cameras aboard the aircraft. When flying FPV the remote pilot cannot monitor the flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions to the same extent as a remote pilot maintaining external direct, unaided visual contact with the aircraft.

6) Free flight model aircraft:

A free-flight model aircraft cannot be remotely piloted and does not have software or systems for autonomous control of the flight path. A flight termination device may be fitted. The aircraft trim is adjusted prior to flight. The aircraft is trimmed (and fuelled if applicable) with the intent that it will follow a substantially circular path relative to the air and ultimately glide to a low velocity landing. A free-flight unmanned aircraft will drift relative to the user depending upon the speed and direction of the wind. The person in charge of the free-flight unmanned aircraft is deemed to be the remote pilot for the purposes of this authorisation.

7) Large Model Aircraft:

A model aircraft with a MTOM of 25Kg or greater, and less than 150Kg.

8) Maximum Take Off Mass (MTOM):

MTOM or 'take-off mass' means the mass of the unmanned aircraft when it is ready for flight with all required equipment and batteries installed and all installed fuel tanks full.

9) Model aircraft:

An unmanned aircraft used for sporting and recreational purposes, flown by direct control inputs made by the remote pilot without any autonomous capability other than for flight stabilisation purposes. A model aircraft may be flown under the auspices of an association, or individually.

Note:

The definition of a model aircraft may include multi-rotor type 'drones'. Any unmanned aircraft being flown in accordance with the definition above is considered a model aircraft. The use of any automation, such as automatic flight modes which alter the position of the aircraft, places the operation outside the definition of a model aircraft, and therefore outside the scope of Article 16. The aircraft must be flown with direct control inputs from the remote pilot.

It is acknowledged that many unmanned aircraft have built in failsafe modes, which may be activated in some instances, for example- loss of control link. Activation of such a mode, although possibly automatic in nature, does not necessarily place the aircraft outside the scope of the definition of a model aircraft.

10) Model Aircraft Flying Display:

Any flying activity deliberately performed, by model aircraft, for the purpose of providing an exhibition or entertainment at an advertised event.

11) Physically constrained model aircraft:

A model aircraft that:

a) is flying within a closed building or other physical construction forming a safely enclosed area; or
b) is a control-line model aircraft; or
c) is a round-the-pole aircraft.

12) Round-the-pole model aircraft:

A model aircraft that is tethered to a fixed point by one or more lines so that its flight is constrained to the surface of a hemisphere around the tether point with a radius equal to the length of the lines.

13) UAS IR:

Commission Implementing regulation (EU) 2019/947 on the rules and procedures for the operation of unmanned aircraft, as 'retained' in UK Domestic Law'.

14) Uninvolved Persons:

Persons who are not participating in the UAS operation or who are not aware of the instructions and safety precautions given by the UAS operator.

15) MAIS Specification:

The integration service developed to allow the model associations to perform registration and renewals.

16) Slow Pass:

A pass must be slow for that aircraft, and at approximately landing approach speed, but not so slow that loss of control / stall is a significant risk.

The risk assessment templates can be downloaded at

https://www.largemodelassociation.com/resources/article16/risk-assessments/

LMA Flying Site Risk Assessment For .....

This assessment has been carried out to comply with the requirements of Section 3.7 and / or Section 3.11 of the LMA Article 16 Operating Authorisation.

Description of flying site and reason for risk assessment ...e.g. public footpath crosses runway threshold

Risk		Initial Assessment			Control Measures		Assessment After All Measures		
What is the Hazard	Who or What May Be Harmed & How	Severity	Likely Hood	Rating	Mitigating Actions	Further Actions Necessary	Severity	Likely Hood	Rating
Model Crash	Uninvolved people on footpath, impact injuries	4	3	12	If overflight of bridleway is necessary for take-off and landing, only overfly when certain no uninvolved people are on the section of the path marked 'A' on the site plan	Only overfly the bridleway if a Spotter is available to check the pack is clear.	4	2	8
	Parked vehicles, impact damage	3	2	6	All vehicles to be parked in the car parking area. No overflying the 'pits' or car parking areas	All overflying of the pits or car parking areas to be dealt with immediatley	3	1	3
	Involved people in 'pits' area, impact injuries	5	3	15	No overflying the 'pits' or car parking areas		4	2	8

Assessment carried out by..... On the.....

Rating After Mitigating Actions	Outcome
8 or below	No further action necessary
Between 9 - 15	Further control actions necessary to reduce overall rating
Above 15	Unacceptable risk

Rating After All Measures	Outcome
8 or below	Control measures will adequately manage risk
Above 8	Unacceptable risk

LMA Risk Assessment Rating Criteria

Severity Rating	Trivial	Minor Injury	Severe Injury	Single Fatality	Multiple Fatalities
	1	2	3	4	5
Likleyhood Rating					
Highly Improbable	1	2	3	4	5
Improbable	2	4	6	8	10
Possible	3	6	9	12	15
Probable	4	8	12	16	20
Highly Probable	5	10	15	20	25