CIVIL AVIATION SAFETY AUTHORITY AUSTRALIA

Advisory Circular

AC 101-3(0) JULY 2002

UNMANNED AIRCRAFT AND ROCKETS
MODEL AIRCRAFT

CONTENTS

APPENDICES

Advisory Circulars are intended to provide recommendations and guidance to illustrate a means but not necessarily the only means of complying with the Regulations, or to explain certain regulatory requirements by providing interpretative and explanatory material.

Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material.

ACs should always be read in conjunction with the referenced regulations

1. REFERENCES

1.1 Civil Aviation Safety Regulation Part 101.

2. PURPOSE

2.1 This document has been developed to provide guidance to builders and operators of model aircraft in the operation and construction of model aircraft and the means whereby they may safely and legally operate these aircraft. This document also provides guidance to approved administration organisations and CASA staff on the regulation of model aircraft activities. While this document prescribes a means of compliance with legislation, alternate procedures demonstrating an equivalent or greater level of safety may be considered on a case by case basis.

3. STATUS OF THIS AC

3.1 This is the first advisory circular to be published on this subject.

4. INTRODUCTION

4.1 The Civil Aviation Act describes the conditions under which an aircraft may fly in Australia. The rules governing that flight are contained in the Civil Aviation Safety Regulations (CASRs) and the rules and regulations for flying model aircraft are contained Part 101 of the CASRs.

4.2 It is the responsibility of the operator of a model aircraft to ensure that the model is flown safely and in accordance with the regulations. The purpose of this publication, which was written in collaboration with the major aeromodelling association, is to provide guidance to anyone intending to fly a model aircraft so that they may achieve that aim.

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

4.4 Nothing in this publication is intended to conflict with Part 101 or other legislation which, in case of doubt, is overriding.

4.5 A list of addresses of organisations referred to in this publication is given at Appendix K.

5. DEFINITION OF A MODEL AIRCRAFT

5.1 A model aircraft is any unmanned aircraft, other than a balloon or kite, which is flown for sport or recreational purposes, weighing not more than 150 kg including fuel and equipment installed in or attached to the aircraft at the commencement of its flight.

5.2 A model aircraft flown for any other purpose is covered by the term ‘Unmanned Aerial Vehicle’ (UAV) and is subject to the rules applicable to UAVs.

5.3 A model aircraft is excluded from the vast majority of the regulations applied to other aircraft. For example, there are no requirements for aircraft registration, pilot licensing or aircraft airworthiness certification, however, the regulations which **DO** apply are contained in Appendix I.

5.4 CASA has classified model aircraft by take off weight (excluding fuel) as follows:

(a) less than 100 grams - exempt;

(b) 100 grams to 25 kilograms - model aircraft;

(c) more than 25 kilograms but not more than 150 kilograms - giant model aircraft.

5.5 A giant model aircraft can only be operated under the rules and procedures of an approved aviation administration organisation such as the MAAA.

6. LEARNING TO FLY

6.1 Local model flying clubs

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

6.1.2 There are numerous model flying clubs throughout Australia and most of them offer training in radio control flying to beginners in the sport.

6.1.3 Details of your local clubs can be obtained from the Associations listed in Appendix K, or you could enquire at your local model shop.

6.2 Learning to fly without a model flying club

6.2.1 It is possible to learn to fly without being a member of a club, but it can be difficult.

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

6.2.3 Appendix A gives basic advice on radio controlled model flying.

6.3 Commercial model flying training

6.3.1 There are a number of organisations and individuals which offer commercial model flying training.

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

7. MODEL AIRCRAFT SAFETY CONSIDERATIONS

7.1 Model aircraft flying - all models

7.1.1 **First**, choose an unobstructed site and at all times keep a safe distance from:

(a) persons;

(b) vessels;

(c) vehicles;

(d) structures.

7.1.2 **Then,** only fly:

(a) in suitable weather;

(b) with regard for any other conditions such as local bylaws;

(c) with due consideration for other people and property.

7.2 Models weighing up to 25 kg

7.2.1 Unless approval has been obtained beforehand, model aircraft should only be flown:

(a) when the weather is suitable;

(b) clear of the movement areas or runways of an aerodrome;

(c) below 400ft above ground level unless:

(i) clear of controlled airspace, and

(ii) further than 3 nautical miles from any aerodrome:

(d) within sight of the operator at all times;

(e) well clear of populous areas;

(f) at least 30m clear of persons, vessels, vehicles or structures. This can be reduced for persons behind the direction of take off. Other model operators and any assistants or officials may be within this distance; as may vessels, vehicles or structures under their control.

7.2.2 The following factors should be considered:

(a) incorporation of an appropriate 'fail-safe' mechanism;

(b) ensure that any load carried on the model is secure;

(c) flights must comply with any other conditions such as bylaws.

7.3 Models Over 25 kg (Giant Model Aircraft)

7.3.1 Giant model aircraft may only be flown in accordance with the rules and procedures of an approved model aircraft organisation such as the MAAA.

8. MODEL AIRCRAFT OPERATING AREAS

8.1 Before flying above 400ft within controlled airspace or within 3 nautical miles of an aerodrome, the operator of a model aircraft must obtain permission from the appropriate air traffic control service or CASA as appropriate.

8.2 Finding Model Flying Sites for Model Aircraft

8.2.1 The operator of a model aircraft weighing over 100 grams is required to obtain permission before flying a model above 400 ft AGL within controlled airspace or within 3 nautical miles of an aerodrome. While this rule means that a model aircraft may be flown above 400 ft AGL clear of these areas, there are advantages in seeking approval for a permanent model aircraft operating area. Publication of the details of a model aircraft operating area means that other users of airspace will be advised where there is potential for conflict with model aircraft.

8.2.2 Try to fly at a site which is already established rather than trying to obtain individual permission. The model associations are listed in Appendix K and should be able to advise you of local sites.

8.2.3 For advice on the location of controlled airspace in a particular part of the country, check with the local CASA district office on CASA's toll free number, 131 757.

8.2.4 Flight within an aerodrome control zone can be cleared by the relevant Air Traffic Control unit. Telephone numbers are listed in local telephone directories under '**Airservices Australia'**.

8.3 Approved Areas

8.3.1 It is far better to establish a permanent model flying site, rather than seek one-off permission. A written permission for the use of a site may have conditions, such as a

height limit and times of use. There may also be a requirement to notify air traffic control when the site is actually being used. There are many sites already established on this sort of basis.

8.3.2 Direct liaison with CASA is needed to arrange this type of permission. This is most easily arranged by a club or and through an Association.

9. COMMERCIAL ACTIVITIES

9.1 Definition

9.1.1 A model aircraft flight is considered to be commercial if it is conducted for any purpose other than the sport of flying the model or learning or teaching the sport. It is commercial if it is used as the tool for conducting any other commercial purpose such as aerial photography, etc.

9.1.2 In simple terms, if you receive financial benefit for the service provided by your model aircraft (other than teaching the sport), you have been conducting a commercial activity.

9.3 CASA Approval

9.3.1 A person conducting commercial activities with model aircraft must do so in accordance with the rules applicable to UAVs and must have an operating certificate issued by CASA. The requirements for obtaining an operating certificate are contained in sub-part F of CASR Part 101 and in AC 101.1.

Bill McIntyre
Executive Manager
Aviation Safety Standards

APPENDIX A RADIO CONTROLLED MODELS (GENERAL)

Always fly with regard to the general regulations concerning radio control flying covered in Sections 5, 6 and 7.

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

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

All radio controlled models are subject to in-flight vibration, landing knocks, transport damage etc. Take care that receivers and batteries are well protected, servos are fixed securely, control linkages (pushrods, snakes, closed loop etc) are robust enough for their purpose, are properly supported where necessary and are as slop free as possible and that all control surface hinges and horns are fitted correctly.

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

With a new or repaired radio control equipment, a ground range check should be performed, preferably with the equipment installed in a model. With the majority of radio equipment look for a minimum ground range of around 50 metres with the transmitter aerial down and the model's controls still functioning correctly with no 'jittering'.

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

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

When preparing for a flight, check that transmitter trims, rate switches etc. are in their correct positions and that each control surface on the model moves freely and in the correct sense.

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

Before take-off, check that both ground and sky are clear and never take off or land towards other pilots, spectators or the 'pits' area.

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

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

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

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

PRE FLYING SESSION CHECKS

On arrival at the flying site, **CHECK:**

- the airframe for any transit damage.
- that servos and linkages are secure.
- the undercarriage for secure fixing and correct alignment.
- the propeller for damage and secure fixing
- control surfaces are secure and move freely.
- engine is securely attached to airframe.

CHECK BEFORE EACH FLIGHT

- If frequency control is in operation, obtain clearance to transmit.
- Switch transmitter **ON** then receiver **ON.** Check that all controls operate freely and in the correct sense. Check that all control surfaces are in their correct positions with the transmitter trims at neutral.
- Look for any minor radio malfunctions such as slow or 'jittery' servos, glitches etc,. If in doubt, **do not fly.**
- After starting the engine and allowing it to warm up, check that the pick-up from idle to full power is satisfactory. Hold the model with its nose pointing upwards at a steep climbing angle for ten or fifteen seconds and check engine operation at full power. If the engine falters or cuts it is usually set too lean and must be re-tuned. Repeat the test until the engine runs correctly in the nose-up attitude.
- With the aircraft held securely on the ground, open up again to full power and recheck all flying controls again.
- Double Check that all transmitter trims, rate switches, mixers etc. are in their correct positions and that the transmitter meter is 'in the green'.

BEFORE FLYING

Be **S.M.A.R.T.** with your transmitter.

Switch on

Meter in the green

Aerial secure and extended

Rate switches in all correct positions

Trims all in correct positions

CHECKS AFTER EACH FLIGHT

- Receiver **OFF** then transmitter **OFF**
- Clear the frequency control system if it is in operation.
- Check propeller, airframe, undercarriage, wing fixing etc. for security of fastening and for possible flight or landing damage

- Remember - Avoid flying with a damaged aircraft or propeller, or with any possible radio problem

APPENDIX B RADIO CONTROLLED HELICOPTERS

Only fly with regard to the general regulations concerning radio control flying covered in chapters 5, 6 and 7

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

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

When starting the model in the pits, hold the rotor head firmly. When the engine is running carry the model a sensible distance from other people before running up or flying.

Do not release the rotor of the model until you are sure that it is safe to do so.

Never hold the model overhead to run up the engine or run the engine with no rotor blades fitted.

Rotor blades should be carefully balanced before use.

A MODEL HELICOPTER MUST NOT BE FLOWN OR RUN UP:

- ln or near the ‘pits’ area or close to any spectators.
- Except as part of a manoeuvre well away from other people, they are not to be flown directly towards the pits area or any spectators.
- With metal rotor blades.
- With knife-sharp leading edges on main or tail rotors.
- With damaged or out of balance rotor blades. Note that blades, especially wooden ones, should be reinforced at the root with hardwood, glass-fibre or some other suitable material.
- With radio equipment unproofed against shock and vibration.

CHECKS BEFORE A FLYING SESSION

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

CHECKS BEFORE EACH FLIGHT

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

APPENDIX C RADIO CONTROLLED SILENT FLIGHT (GLIDERS AND ELECTRIC POWERED MODELS)

Flying radio-controlled gliders and electrically powered models are essentially safe and environmentally acceptable pastimes provided a few basic safety precautions are taken.

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

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

(See **Appendix K** for addresses)

Before you even buy a model, local club members will be happy to advise on the best type of model to build and fly. They can advise on finishing the model and, most importantly, they can 'trim' the model for you so that it will fly safely.

FLYING THE GLIDER

Launching

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

IF IN DOUBT, DO NOT FLY.

Flying

- **When learning to fly, try to keep the model upwind** and leave yourself with plenty of altitude to make a proper landing approach.
- **Avoid flying the model directly into or across the sun;** the glare may cause you to lose sight of the model and effective control may be lost. Good sunglasses can minimise this problem and also protect your eyes.

- **Do not let the model fly too far downwind.** The smaller the model appears, the more difficult it is to fly and orientation becomes more of a problem. Know the limitations of your eyesight and always fly within 'easy' visual range.

Landing

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

ELECTROFLIGHT

For electrically powered models, all the safe operating conditions described in **Appendix A** apply. In addition:

- When fast charging Ni-Cad batteries, use a battery charger equipped with either a timer or a voltage or temperature controlled cut-off. Overcharging Ni-Cad batteries at high currents can be dangerous.
- Lithium batteries/cells require a special charger or they may catch fire/explode.
- Check carefully that motor operation does not interfere with the radio control equipment in the model. A range check with motor on and off should be carried out with all new installations. If in doubt, **do not fly.**
- Current flows in the battery-controller-motor setup of electroflight models can be extremely high. Make sure that all cables and connectors are in good order and are robust enough to perform without significant overheating.
- Take great care when handling any electroflight model that has its batteries fitted. The power and torque of electric motors can be very high and contact between a turning propeller and any obstruction will not stop the motor, but will just make it try to turn harder.
- If possible use a speed controller that incorporates a "safety circuit" that will not allow the motor to start unless the throttle has been brought back to the "stop" position.
- Disconnect your power pack as soon as possible after you have finished flying.
- Do not leave you model "live" if unattended.

APPENDIX D GAS TURBINE POWERED MODEL AIRCRAFT.

Advances in ceramic bearing technology, micro electronics and some clever design work have enabled the development of the micro gas turbine engine for use in the propulsion of model aircraft.

This development has opened up a new and very technical aspect of the model aviation.

Safety in the operation of any model aircraft is paramount, and even more so when using a turbine engine for propulsion. A turbine powered model aircraft is a very complicated and technical piece of equipment and is not recommended for a beginner to model aviation

Aircraft powered by Gas Turbine Engines can be very dangerous in the hands of inexperienced operators and without specific safety precautions being in place. The engines operate at very high speed, over 100,000 revolutions per minute, and very high internal temperatures. It is imperative that the builder has a very good working knowledge of the operation the engine being used. The airframe has to be built to a very high standard and this requires the builder being conversant with the use of materials such as composites, epoxy and polyester resins.

In addition, the aircraft are generally capable of flying at speeds up to 400 km per hour and are extremely agile. The high speed and high kinetic energy of turbine powered model aircraft require corresponding anticipation and skill to prevent the model exceeding altitude limits or infringing safety zones. The level of competence required to enable a pilot to fly a turbine powered aircraft is very high.

The operation of gas turbine powered aircraft can be dangerous for both the operators and the public.

It is strongly recommended that a model aviation organisation with comprehensive safety precautions be contacted in order for the operator to be trained in the requirements. The model and the operating and flying ability of the pilot will almost certainly be checked before being allowed to fly.

General

In addition to the provisions at Appendix A, the following safety provisions should be observed when operating gas turbine powered model aircraft:

- Engine(s) should be in standard production configuration with no modifications other than those tested, documented, and approved in writing by the manufacturer.
- Engines should be operated in accordance with the manufacturer's operating guidelines at all times.
- Only fuels such as kerosene, propane, dieseline and gasoline should be used.
- Propane powered engines should be isolated to prevent cross ignition in multi-engine installations.
- Tailpipes should be directed away from other personnel and public.

- A fire extinguisher should be present during all operations.
- Gas turbine powered model aircraft should not be flown during periods of total fire bans.
- Refuelling areas should be established well clear of persons and operating aircraft.
- Any engine involved in a crash should not be operated until inspected by the manufacturer or approved service centre, prior to operating and flying again.

Aircraft

- In addition to standard engine fuel control, a fail safe FUEL SHUTOFF VALVE should be installed for remote operation by the pilot.
- the engine should have over-speed prevention
- Wheel brakes should be fitted if the aircraft cannot remain at rest without external restraint when the engine is at idle speed.

Home Built Turbines.

- All engines, including those built from recognised plans, should be inspected by an appropriately qualified person prior to installation in an airframe.
- Prior to flight test, an installation inspection should be performed which should include starting and ground running. The pilot should use this period to familiarize him- or herself with the handling characteristics of the engine and associated systems.
- Following a successful ground inspection a flight test may be carried out well clear of all persons and populous areas.
- Engines installed in airframes not originally designed for turbine operations should also be inspected and test flown

APPENDIX E MODELS OVER 25 KG - PERMISSIONS

THE NEED FOR PERMISSION

Model aircraft weighing more than 25 kg are subject to all of the safety rules of CASR Part 101 as well as the rules and procedures of an approved model aircraft club or association.

Any permission will only be issued once it has been determined that the model is designed and built to a satisfactory standard.

Any person or group contemplating building an aircraft that is likely to weigh more than 25 kg should apply at an early stage to one of the modelling associations for advice. (See Appendix K)

DESIGN AND BUILD ADVICE AND INSPECTION

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

The assisting member will confirm satisfactory design and build standards It is particularly important to build to a schedule if the construction does not readily allow access to all parts of the model for a final inspection - such as box sections.

Assistance and advice may be subject to membership of an appropriate association.

Any special operating conditions applicable to the model can also be recommended at this stage.

APPENDIX F FREE FLIGHT MODELS

ONLY FLY

On sites that are clear and open with adequate open space downwind of the launch point. (With a strong wind this distance could be considerable).

In good visibility.

After you have ensured that any spectators are clear of the intended initial flight path of-the model.

With due consideration for other people and property

APPENDIX G CONTROL LINE MODELS

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

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

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

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

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

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

APPENDIX H MODEL DISPLAYS

GENERAL

This section provides general guidance for planning and organising a model flying display. As the size and nature of such events varies considerably it is only possible to incorporate in this publication general pointers in terms of safety and control. It is recommended that groups contemplating holding a model flying display should also refer to the appropriate model aircraft club or association. Addresses of these organisations can be found in **Appendix K.**

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

An Events Director, who will assume overall responsibility for the planning, organisation and subsequent running of the event.

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

Organisation

The organisers should:

- Determine whether the site permits the separation distances that will be required for the type(s) of model that are to be flown or, if not, whether CASA would allow an exception to be made in this instance.
- Establish whether a CASA approval will be required for the display and if so apply for it at least 21 days in advance.
- Ensure that arrangements are made for:
    - ◊ spectator control or, in the case of an event at which model flying is part of a larger function, the siting of the model flying area in relation to spectator enclosures, car parks etc..
    - ◊ Provision for verification of the competence of all pilots taking part in the display.
    - ◊ Effective transmitter control and frequency monitoring facilities in the case of radio control flying.
    - ◊ Airworthiness and safety checking of all model aircraft and equipment to be used in the display.
    - ◊ Verification of third party public liability insurance covering individual flyers, any model flying clubs involved in the display and the display organisers.
    - ◊ Liaison with the police and local authorities if required or, in the case where model flying is part of a larger function, written notification to the function organisers of any special requirements.

NOTE: Radio control flying displays should not take placewithout prior consultation with CASA. Such consultation should be sought as early as possible but not less than 21 days before the display.

Flight line Director

The Flight Line Director is responsible for the flight safety of the display and must exercise authority over all flying matters. He or she must not hesitate to discipline pilots if necessary and he or she has the final say on all matters on the flightline.

Radio Control Display Sites

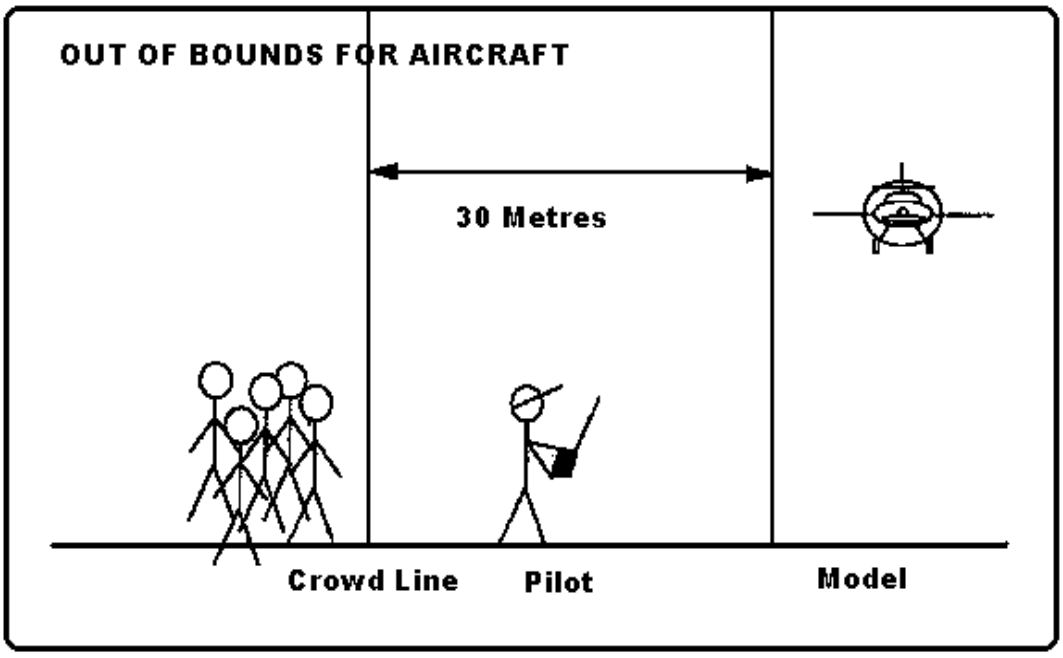
A firm surface or mown grass area for take-off and landing of recommended minimum size 100 x 40 metres should be available, with the 100 metres direction substantially into wind.

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

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

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

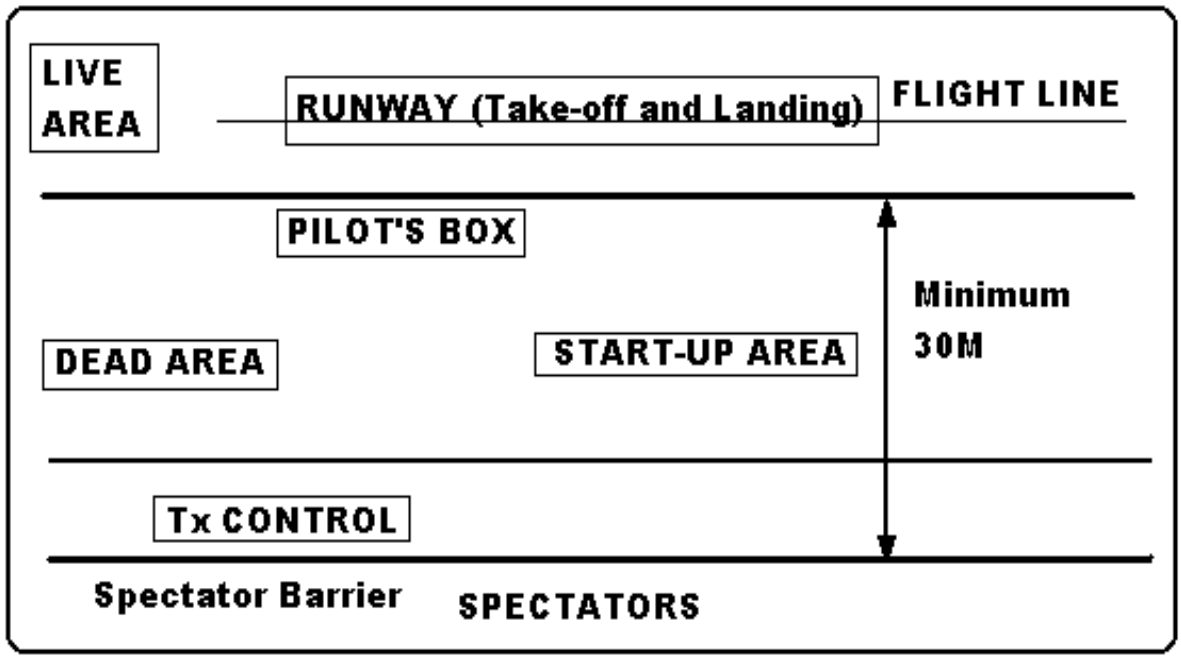
The distance of models from spectators should not be less than 30 metres for all operations including take-off or landing.



Site Layout

The layout below is a standard type which may have to be modified slightly depending upon site conditions and the number of spectators expected. Areas should be allocated for the flight lines, pits, start up positions and pilots box. Safety should always be the prime

consideration. Indeed, if the site requires significant deviation from this, great care should be exercised in the acceptance of the site as suitable for a display event.



Control Line Display Sites

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

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

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

Spectators should be behind stout rope barriers or similar restraints surrounding the flying area and sufficient marshals should be appointed to ensure that the spectators are kept under control.

APPENDIX I POWERLINES

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

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

If wires are damaged by a model -

- **Stay clear and call the electricity supply authority.**
- Even small wires can carry lethal voltages and these can extend into the ground around the end of a broken line - sometimes up to several metres.

Never try to ‘rescue’ a model with a wooden pole or other ‘non conductor’ - under some weather conditions, many materials will conduct high voltage electricity.

APPENDIX J RELEVANT LEGISLATION

Model aircraft are regulated under *Civil Aviation Regulations 1988* Part 101. Relevant sections of Part 101 are copied here for information.

101.005 Applicability of this Part

(1) This Part sets out the requirements for the operation of unmanned aircraft (including model aircraft), and (to the extent that the operation of rockets and fireworks affects or may affect the safety of air navigation) the operation of rockets and the use of certain fireworks.

(2) Nothing in this Part applies to the operation of a manned balloon or a hot air balloon.

(3) Subparts C to I do not apply to the operation of:

(a) a control-line model aircraft (that is, a model aircraft that is constrained to fly in a circle, and is controlled in attitude and altitude, by means of inextensible wires attached to a handle held by the person operating the model); or

(b) a model aircraft indoors; or

(c) an unmanned airship indoors; or

(d) a small balloon within 100 metres of a structure and not above the top of the structure; or

(e) an unmanned tethered balloon that remains below 400 feet above ground level; or

(f) a firework rocket not capable of rising more than 400 feet above ground level.

Note Subpart B applies to the operation of all unmanned aircraft (including model aircraft) and rockets, including firework rockets.

(4) For paragraph (3) (c), a flight does not take place indoors if the building in which it takes place has the roof, or 1 or more walls, removed.

101.010 Application to rocket-powered unmanned aircraft

This Part applies to a rocket-powered unmanned aircraft, and to the operation of such an aircraft, unless the contrary intention appears.

101.015 Application of registration and marking requirements

Part 3 of CAR 1988, and Part 45 of CAR 1998, do not apply to an aircraft (other than a large UAV) to which this Part applies, nor to a micro UAV.

Note A large UAV is required to carry a manufacturer's data plate and an aircraft registration identification plate — see respectively regulation 21.820 and Part 45 Subpart D.

101.020 Exemption from certain other provisions of CAR 1988

Parts 4, 4A, 4B, 5, 7, 10, 11, 12 and 13 of CAR 1988 do not apply to an aircraft to which this Part applies, nor to a micro UAV.

101.025 Meaning of *populous area*

For this Part, an area is a ***populous area*** in relation to the operation of an unmanned aircraft or rocket if the area has a sufficient density of population for some aspect of the operation, or some event that might happen during the operation (in particular, a fault in, or failure of, the aircraft or rocket) to pose an unreasonable risk to the life, safety or property of somebody who is in the area but is not connected with the operation.

101.030 Approval of areas for operation of unmanned aircraft or rockets

(1) A person may apply to CASA for the approval of an area as an area for the operation of:

(a) unmanned aircraft generally; or a particular class of unmanned aircraft; or

(b) rockets.

(2) For paragraph (1) (a), the classes of unmanned aircraft are the following:

(a) tethered balloons and kites;

(b) unmanned free balloons;

(c) UAVs;

(d) model aircraft.

(3) In considering whether to approve an area for any of those purposes, CASA must take into account the likely effect on the safety of air navigation of the operation of unmanned aircraft in, or the launching of rockets in or over, the area.

(4) An approval has effect from the time written notice of it is given to the applicant, or a later day or day and time stated in the approval.

(5) An approval may be expressed to have effect for a particular period (including a period of less than 1 day), or indefinitely.

(6) CASA may impose conditions on the approval in the interests of the safety of air navigation.

(7) If CASA approves an area under subregulation (1), it must publish details of the approval (including any condition) in NOTAM or on an aeronautical chart.

(8) CASA may revoke the approval of an area, or change the conditions that apply to such an approval, in the interests of the safety of air navigation, but must publish details of any revocation or change in NOTAM or on an aeronautical chart.

(9) CASA must also give written notice of the revocation or change:

(a) to the person who applied for the approval of the area; or

(b) if that person applied for that approval as an officer of an organisation concerned with unmanned aircraft or rockets, and no longer holds that office — to the person who now holds the office.

101.035 Requirements in this Part to give information to CASA

(1) If a provision of this Part requires a person to give information to CASA about the operation, launching or release of an unmanned aircraft or rocket, then, unless the provision says otherwise, the person may do so by giving the information to:

(a) if the person is an approved aviation administration organisation — the Australian NOTAM Office; or

(b) an appropriate approved aviation administration organisation.

(2) However, subregulation (1) does not apply in relation to the release of small balloons, or in relation to a firework display.

(3) The information need not be given in writing unless:

(a) CASA or the authority to which it is given asks for it to be given in writing in the particular case; or

(b) another provision of these Regulations requires it to be given in writing.

(4) If a person gives the information to an authority mentioned in paragraph (1) (a) or (b), then, subject to subregulation (6), the person is taken, for all purposes, to have complied with the requirement to give the information.

(5) If in a particular case CASA or the authority to which the information is given reasonably requires extra information about the operation, launching or release, CASA or the authority may ask the person for the extra information.

(6) If CASA or an authority asks for more information under subregulation (5), the person is not taken to have complied with the requirement mentioned in subregulation (1) to give the information until the person gives to CASA or the authority the extra information.

(7) If a day is not a working day for the office of CASA or an authority to which notice of an event is given or an application made, that day does not count for the purpose of working out how many working days' notice of the event has been given, or how many working days before an event the application has been made.

(8) In subregulation (7):

working day, in relation to an office of CASA or an authority, means a day on which that office is open for business.

101.040 Exemptions

(1) CASA may do either or both of the following by instrument, in relation to a particular unmanned aircraft or rocket or type of unmanned aircraft or rocket:

(a) exempt the aircraft or rocket, or aircraft or rockets of that type, from compliance with a specified provision of Subparts C to H;

(b) exempt a person from compliance with a specified provision of Subparts C to H while he or she is operating the aircraft or launching the rocket, or operating aircraft or launching rockets of that type.

(2) Before CASA decides under subregulation (1) to exempt an aircraft, rocket or type, or a person, from compliance with a provision of any of Subparts C to H, CASA must take into account any relevant considerations relating to the safety of air navigation.

(3) CASA may impose a condition necessary in the interests of the safety of air navigation on such an exemption.

(4) A person who contravenes such a condition is guilty of an offence punishable by a fine of 50 penalty units.

(5) Regulation 308 of CAR 1988 does not authorise CASA to grant exemptions from the provisions of this Part.

101.045 Conditions imposed by CASA or another authority

(1) If a provision of this Part (other than regulation 101.030) authorises CASA or another authority to impose a condition on an approval, permission, certification or exemption, CASA or the authority must give a written statement of any condition so imposed to the person who applied for the approval, permission, certification or exemption.

(2) Unless CASA or the authority gives the statement to the person, the person is not bound by the condition.

Subpart B General prohibition on unsafe operation

101.050 Applicability of this Subpart

This Subpart applies to the operation of all unmanned aircraft and rockets that are not aircraft, whether or not any of Subparts C to I applies.

101.055 Hazardous operation prohibited

(1) A person must not operate an unmanned aircraft in a way that creates a hazard to another aircraft, another person, or property.

Penalty: 50 penalty units.

(2) A person must not launch a rocket that is not an aircraft in a way that creates a hazard to an aircraft.

Penalty: 50 penalty units.

(3) A person must not launch a rocket that is not an aircraft in a way that creates a hazard to another person or to property.

Penalty: 50 penalty units.

(4) It is not a defence to a charge of contravening subregulation (1), (2) or (3) that the relevant unmanned aircraft was being operated, or the relevant rocket was launched, in a way that complied with the operations manual of an approved aviation administration organisation.

(5) In subregulations (2) and (3):

rocket includes a firework rocket, regardless of whether it can rise more than 400 feet above ground level or not.

Subpart C Provisions applicable to unmanned aircraft generally

101.060 Applicability of this Subpart

This Subpart applies to the operation of unmanned aircraft of all kinds, except operation mentioned in subregulation 101.005 (3).

Note Rockets that are not aircraft are dealt with separately in Subpart H.

101.065 Operation in prohibited or restricted area

(1) A person must not operate an unmanned aircraft in or over a prohibited area, or in or over a restricted area, except with the permission of, and in accordance with any conditions imposed by, the authority controlling the area.

Penalty: 25 penalty units.

Note For ***prohibited area*** and ***restricted area***, see r 2.07 of the Air Services Regulations. Details of prohibited or restricted areas are published in AIP or NOTAM.

(2) In subregulation (1):

authority controlling the area means:

(a) in the case of a prohibited area — the Secretary to the Department of Defence; and

(b) in the case of a restricted area — the authority mentioned in AIP (as issued from time to time) as the controlling authority for the area.

(3) For subregulation (1):

(a) the authority controlling the area must give a written statement of any condition so imposed to the person who applied for the permission; and

(b) unless the authority gives the statement to the person, the person is not bound by the condition.

101.070 Operation in controlled airspace

A person must not operate an unmanned aircraft above 400 feet AGL in controlled airspace, except:

(a) in an area approved under regulation 101.030 as an area for the operation of unmanned aircraft of the same kind as the aircraft, and in accordance with any conditions of the approval; and

(b) in accordance with an air traffic control clearance.

Penalty: 50 penalty units.

Note AGL = above ground level (see the Dictionary).

101.075 Operation near aerodromes

(1) A person must not operate an unmanned aircraft at an altitude above 400 feet AGL within 3 nautical miles of an aerodrome unless:

(a) the operation is permitted by another provision of this Part; or

(b) permission has been given for the operation under regulation 101.080.

Penalty: 25 penalty units.

Note AGL = above ground level (see the Dictionary).

(2) A person must not operate an unmanned aircraft over an area mentioned in paragraph (3) (a) or (b) unless:

(a) the operation is permitted by another provision of this Part; or

(b) permission has been given for the operation under regulation 101.080.

Penalty: 25 penalty units.

(3) The areas for subregulation (2) are:

(a) a movement area or runway of an aerodrome; and

(b) the approach or departure path of a runway of an aerodrome.

(4) A person must not operate an unmanned aircraft in such a manner as to create an obstruction to an aircraft taking off from, or approaching for landing at, a landing area or a runway of an aerodrome.

Penalty: 25 penalty units.

101.080 Permission for operation of unmanned aircraft near aerodrome

(1) The authority from which permission must be obtained for the purposes of regulation 101.075 is:

(a) if the aerodrome concerned is a controlled aerodrome — the air traffic control service for the aerodrome; or

(b) in the case of any other aerodrome — CASA.

(2) A person applies for permission under this regulation by giving to the relevant authority mentioned in subregulation (1) the information required by the following table, so far as relevant to the proposed operation:

Details of operation of unmanned aircraft to be given to CASA or ATC

Column 1 *Item*	*Column 2* *Information to be provided*
1	In all cases: (a) the name, address and telephone number of the person who will operate the aircraft or (if the aircraft concerned is an unmanned free balloon) release the balloon (or, if several people will be involved, the name, address and telephone number of the person who will coordinate the operation); and (b) the date and time the operation or release is to begin and how long it is to last; and (c) where it is to be carried out; and (d) if more than 1 unmanned aircraft is to be operated at a time, how many unmanned aircraft are to be operated at that time
2	In the case of the operation of a tethered balloon or a kite: (a) a brief description of the balloon or kite, including its predominant colour; and (b) the height to which it is to be operated; and (c) its mass
3	In the case of the release of a free balloon: (a) how many balloons are to be released; and (b) the estimated size and mass of the balloon's payload
4	In the case of the release of a medium or heavy balloon: (a) the balloon's flight identification or its project code name; and (b) the balloon's classification, or a description of the balloon; and (c) the balloon's SSR code or NDB frequency, and its Morse identification; and (d) the expected horizontal direction of the balloon's ascent, and the balloon's expected rate of climb; and (e) the balloon's float level (given as pressure altitude); and (f) when the balloon is expected to reach 60 000 feet pressure altitude, and the location over which it is expected to do so; and (g) when the flight is expected to end, and where the balloon and its payload are expected to fall

Note For ***free balloon*** and ***heavy balloon***, see regulation **Error! Reference source not found.**. For ***tethered balloon***, see regulation **Error! Reference source not found.**.

(3) If more than 1 aircraft is to be operated at a time, such a requirement is a requirement to give the information about each such aircraft.

(4) Regulation 101.035 does not authorise a person who or that applies for permission under this regulation to make the application to a body mentioned in paragraph 101.035 (1) (a) or (b).

(5) If the authority grants the permission, it may impose conditions on the permission in the interests of the safety of air navigation.

(6) A person who fails to comply with a condition mentioned in subregulation (5) commits an offence punishable by a fine of 50 penalty units.

101.085 Maximum operating height

A person must not operate an unmanned aircraft at above 400 feet AGL except:

(a) in an area approved under regulation 101.030 as an area for the operation of unmanned aircraft of the same class as the aircraft concerned, and in accordance with any conditions of the approval; or

(b) as otherwise permitted by this Part.

Penalty: 50 penalty units.

Note AGL = above ground level (see the Dictionary).

101.090 Dropping or discharging of things

A person must not cause a thing to be dropped or discharged from an unmanned aircraft in a way that creates a hazard to another aircraft, a person, or property.

Penalty: 25 penalty units.

101.095 Weather and day limitations

Except as otherwise permitted by this Part, or in accordance with an air traffic control direction, a person must not operate an unmanned aircraft:

(a) in or into cloud; or

(b) at night;

(c) in conditions other than VMC.

Penalty: 25 penalty

Subpart G Model aircraft

101.370 Applicability of this Subpart

This Subpart applies to the operation of model aircraft weighing 100 grams or more (except operation mentioned in paragraph 101.005 (3) (a) or (b)).

Note 1 For ***model aircraft*** see the Dictionary.

Note 2 This Subpart does not apply to:

(a) a control-line model aircraft (that is, a model aircraft that is constrained to fly in a circle, and is controlled in attitude and altitude, by means of inextensible wires attached to a handle held by the person operating the model); or

(b) a model aircraft flown indoors.

See r 101.005 (3).

101.375 Definitions for Subpart

In this Subpart:

approved area means an area approved under regulation 101.030 as an area for the operation of model aircraft.

Note CASA must publish details of the approval of an area (including any conditions) in NOTAM or on an aeronautical chart — see r 101.030 (5).

giant model aircraft means a model aircraft that has a take-off mass (excluding fuel) of more than 25 kilograms, but not more than 150 kilograms.

Note For ***model aircraft*** see the Dictionary.

101.380 Visibility for operation of model aircraft

A person must not operate a model aircraft unless the visibility at the time is good enough for the person operating the model to be able to see it continuously.

Penalty: 25 penalty units.

101.385 Operating model aircraft at night

A person must not operate a model aircraft at night except in accordance with the written procedures of an approved aviation administration organisation.

Penalty: 25 penalty units.

101.390 Keeping model aircraft away from people

(1) A person must not operate a model aircraft over a populous area at a height less than the height from which, if any of its components fails, it would be able to clear the area.

Penalty: 50 penalty units.

Note For ***populous area***, see regulation 101.025.

(2) Subject to subregulations (3) and (4), somebody who is operating a powered model aircraft must ensure that, while the model aircraft is in flight, or is landing or taking off, it stays at least 30 metres away from anyone not directly associated with the operation of model aircraft.

Penalty: 50 penalty units.

(3) Subregulation (2) is not contravened if somebody stands behind the model aircraft while it is taking off.

(4) Subregulation (2) is also not contravened if, as part of a model flying competition, a model aircraft is flown within 30 metres of somebody who is judging the competition.

101.395 Operation of model aircraft outside approved areas

A person must not operate a model aircraft outside an approved area above 400 feet AGL unless he or she:

(a) keeps it in sight; and

(b) keeps it clear of populous areas.

Penalty: 10 penalty units.

Note 1 For ***populous area***, see regulation 101.025. ***AGL*** = above ground level (see the Dictionary).

Note 2 CASA must publish details of the approval of an area (including any conditions) in NOTAM or on an aeronautical chart — see r 101.030 (5)

101.400 Giant model aircraft

(1) A person must not operate a giant model aircraft except in accordance with:

(a) the rules and procedures of an approved aviation administration organisation; or

(b) an approval given by CASA.

Penalty: 50 penalty units.

Note For ***giant model aircraft***, see regulation 101.375.

(2) CASA may impose a condition on the operation of a giant model aircraft if the condition is reasonably necessary in the circumstances in the interests of aviation safety.

(3) If the operator does not comply with the condition, he or she is guilty of an offence punishable by a fine of 50 penalty units.

101.405 Model flying displays

(1) A person must not conduct a model aircraft flying display except in compliance with subregulation (2) or (3).

Penalty: 50 penalty units.

(2) A person complies with this subregulation if the display is conducted:

(a) in an approved area; and

(b) in accordance with the rules and procedures of an approved aviation administration organisation.

Note CASA must publish details of the approval of an area (including any conditions) in NOTAM or on an aeronautical chart — see r 101.030 (5)

(3) A person complies with this subregulation if the display is conducted in accordance with the following conditions and any other conditions imposed by CASA under subregulation (4):

(a) at least 21 days before the display, somebody is nominated as the organiser of the display;

(b) at least 21 days before the display, he or she gives to CASA the following information:

(i) his or her name, address and telephone number;

(ii) the proposed program of flying;

(iii) where the display will be held, and how big the intended flying field is;

(iv) how many spectators are expected, and where they will be;

(c) he or she ensures that:

(i) having regard to the events making up the display, proper precautions are taken for the safety of the participants and spectators; and

(ii) the operators participating in the display are competent to carry out each proposed manoeuvre safely.

(4) CASA may impose a condition on the conduct of a model flying display if in the circumstances the condition is reasonably necessary in the interests of aviation safety.

APPENDIX K USEFUL CONTACTS

Model Aeronautical Association of Australia
Sec Ivan Chiselett
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Vic 3129
Phone (03) 9897 1220
Fax (03) 9897 1445
e-mail **maaasec@ozemail.com.au**
web site; www.maaa.asn.au

State Associations
Australian Capital Territory
Australian Capital Territory Aeromodeller Association (member of the MAAA)
Sec David Haycraft
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Phone (02) 6282 2276
e-mail d.haycraft@acslink.aone.net
web site; www.acslink.aone.net.au/actaol/

Western Australia
Aeromodeller of Western Australia (member of the MAAA)
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web site; www.wamasc.org.au/awa.htm

New South Wales (Radio Control)
Minature Aero Sport of New South Wales (member of the MAAA)
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Phone (02) 9673 2737
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web site; www.ozemail.com.au/~masnsw

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Tasmania
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