



Advisory Circular

AC 101-2(0)

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UNMANNED AIRCRAFT AND ROCKETS: ROCKETS

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1 REFERENCES

- 1.1** CASR Part 101
- 1.1** Australian Rocketry Association Code for Unmanned Rockets (the Blue Book)

2. PURPOSE

2.1 This document has been developed to provide guidance to the public in the operation of rockets and the means whereby they may safely and legally launch them. This document also provides guidance to CASA staff on the processing of approvals for launching of rockets. 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.

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

4 BACKGROUND

4.1 This guide has been developed through consultation and input from various groups as a guide for use by the general public.

4.2 Under the *Civil Aviation Act 1988*, the Civil Aviation Safety Authority (CASA) is charged with the responsibility for safety regulation of civil air operations in Australian territory by developing and promulgating appropriate, clear and concise aviation safety standards. This responsibility extends to the regulation of rocketry insofar as rocketry has the potential to create a hazard to air navigation. All but the smallest of model rockets have the ability to exceed the limits in legislation published by CASA.

4.3 The legislation governing the operation of rockets is contained in Civil Aviation Safety Regulation (CASR) Part 101 Unmanned Aircraft and Rockets. It is the legal responsibility of the operator of a rocket to ensure that the rocket is flown in accordance with that legislation. This guide is intended to provide a simple interpretation of relevant legislation for persons intending to conduct rocketry activities. Guidance beyond legal requirements is also given so that the knowledge of experienced flyers can be of use to those new to flying rockets.

5 LEGAL REQUIREMENTS

5.1 Definitions of rockets

5.1.1 A rocket is defined as a pilotless vehicle powered by reaction that carries all the components necessary to provide its jet. This is a general description of all rockets, rockets are defined further as:

- (a) **Model** Means any rocket weighing not more than 1500g which is propelled by one or more rocket motors producing not more than 320Ns total impulse; that contains a device for returning it to the ground in a condition to fly again; whose structural parts are made of paper, wood or breakable plastic and which contains no metal as structural parts. Model rockets may be further classified as:
 - (i) **small.** Any rocket weighing less than 500g and having 20Ns or less total impulse, and
 - (ii) **firework.** Generally a paper or cardboard device with a stick and which is not intended for re-use and which is not capable of rising above 400ft AGL.
- (b) **High power** means a rocket whose construction technique is similar to a model rocket but exceeds the limits for a model rocket. A high power rocket weighs more than 1500g and is propelled by one or more motors having a total impulse greater than 320Ns.
- (c) **Commercial.** The term 'high power' would also cover rockets used for a commercial purpose other than purely for the study of rockets by students at school. Such rockets would include space launchers, sub-orbital rockets, sounding rockets and rockets which would normally be able to exceed an altitude of 60,000ft. Commercial rockets may require a launch permit from the Department of Industry, Science and Resources.

5.1.2 Rockets are excluded from the vast majority of CASA regulations applied to other aircraft. For example; there are no requirements for aircraft airworthiness certification, pilot licensing or aircraft registration, however, the regulations which **do** apply are in Appendix D with an explanation of the most important rules in the following paragraphs.

5.1.3 Rocketeers should note that failure to observe the requirements of CASA regulations may render the rocketeer liable to a fine. It is no excuse that the rules of a club or association may allow an operation despite the fact that CASA does not.

5.2 CASR Part 101.030 Approval of areas for operation of unmanned aircraft or rockets

5.2.1 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.

5.2.2 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.

5.2.3 The provisions provided in 101.030 allow anybody to apply for areas to be established. Persons in general will find it much easier to obtain areas being a member of a rocketry club. The provisions are shown in Appendix C of this Advisory Circular.

5.3 CASR Part 101.055 Hazardous operation prohibited

5.3.1 A person must not launch a rocket that is not an aircraft in a way that creates a hazard to an aircraft, person or property.

5.3.2 Although this may seem quite clear, in practice it is very difficult to prove, other than after an accident or incident, that a rocket was operated in a hazardous manner. However, a person who operates a rocket in compliance with a safety code such as the codes at Appendixes 3 and 4 is unlikely to cause a hazard to persons or property.

5.4 CASR Part 101.420 Application of State and Territory laws about rockets

5.4.1 Despite the rules contained in Part 101, a person who wishes to operate rockets must realize that there may be relevant State and Territory rules governing the handling and use of rockets. These rule may be in addition to CASR Part 101

5.5 CASR Part 101.430 Launching rocket in or over prohibited or restricted area

5.5.1 A person must not launch a rocket (including a model rocket) 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.

5.5.2 This means is that a person cannot operate a model rocket in this type of airspace without approval. Examples of special use airspace are:

- (a) military flying training areas;
- (b) military firing or bombing ranges;
- (c) ammunition storage areas;
- (d) blasting areas;
- (e) radio telescope installations.

5.5.3 These areas need to be protected and the controlling authority in each case would need to give approval before rocket operations could take place.

5.6 CASR 101.435 Launching rockets into controlled airspace

5.6.1 A person must not launch a rocket (including a model rocket) to higher than 400 feet AGL in controlled airspace, except:

- (a) in an approved area; or
- (b) in accordance with an air traffic control clearance.

5.6.2 This means is a person may operate a rocket in controlled airspace without permission if the rocket does not fly higher than 400ft AGL. If the rocket is to be flown in an approved model rocketry area which is situated within controlled airspace, it may be operated without permission but only in accordance with the rules applicable to that area which would include a maximum operating altitude. To determine the location of model rocketry areas and where controlled airspace starts, it is advisable to contact CASA or a local club.

5.6.3 ATC or CASA may give permission for a launch or series of launches within controlled airspace but outside of an approved area if the operator provides timely advice and sufficient details and CASA or ATC are satisfied that the safety of other airspace users is not compromised.

5.7 CASR Part 101.440 Launching rockets near aerodromes

5.7.1 A person must not launch a rocket (except a small model rocket) to higher than 400 feet AGL within 3 nautical miles of an aerodrome unless:

- (a) doing so is permitted by another provision of this Part; or
- (b) permission has been given for the operation under regulation 101.445.

5.7.2 For operators of rockets, an aerodrome should be considered to be a place which is customarily used by normal aircraft for landing and taking-off. The approach and departures paths are those paths most commonly used to arrive at or depart from an aerodrome in the course of normal operations. Thus, if there is regular air traffic to and from an aerodrome over a potential rocket launching site, that site should not be used except with specific approval.

5.7.3 While the regulation states that a person may not operate an unmanned aircraft or rocket above 400ft within 3 nautical miles (6km) of an aerodrome, regulation 101.470 further extends that limit to 5 nautical miles or 8km.

5.8 CASR Part 101.445 Getting permission for launch of rocket near aerodrome

5.8.1 A person who wishes to launch a rocket near an aerodrome may do so after getting permission from air traffic control, if the aerodrome is controlled, or from CASA in all other circumstances.

5.9 CASR Part 101.450 High power rockets

5.9.1 The legislation governing high power rocket operations is similar to that governing model rocket operations except for some additional restrictions at 101.450: for example, a person may only operate a high power rocket in an approved area and with appropriate notification to CASA.

5.10 CASR Part 101.455 Maximum operating height of rockets

5.10.1 A person must not launch a rocket (except a model rocket) to higher than 400 feet AGL except:

- (a) in an approved area; or
- (b) as otherwise permitted by this Part.

5.10.2 This means that a person cannot operate a high power rocket higher than 400ft AGL in any area other than one that has been designated by CASA as a suitable area. Provisions have been provided in 101.030 for areas to be established. Persons in general will find it much easier to obtain areas being a member of a rocketry club. The provisions are in Appendix C.

5.11 CASR Part 101.460 Dropping or discharging of things from rockets

5.11.1 A person must not cause anything to be dropped or discharged from a rocket in a way which creates a hazard to an aircraft.

5.11.2 This means that a person cannot allow any objects to be dropped from a rocket if such objects may create a hazard to other aircraft. This means that the operator must ensure that any parts of the rocket such as payloads, boosters, or deployable components must only be released over a safe area.

5.12 CASR Part 101.465 Weather and day limitations - rockets other than model rockets

5.12.1 Except for as otherwise permitted by Part 101 or in accordance with an air traffic control clearance, a person must not launch a rocket (other than a model rocket):

- (a) in or into cloud, or
- (b) at night,
- (c) in conditions other than VMC.

5.12.2 This means that a person cannot operate a model rocket in conditions which would make it difficult to see other aircraft and means, also, that visibility must allow continued observation of the rocket throughout its flight. Provisions have been provided in 101.465 to allow rockets to be operated at night, but there is a further requirement to comply with meteorological restrictions placed on rockets in the model rocket safety code such as not launching in winds greater than 30kmph.

5.13 CASR Part 101.470 Model Rockets

5.13.1 This rule gives the general provisions for launching model rockets and allows limited operation at night and limited operations above 400 feet AGL.

5.14 Penalty provisions

5.14.1 A number of penalty provisions appear throughout the Part. These are the maximum fines applicable for a breach of the regulation. The value of one penalty unit in 2001 was \$110.

6 LEARNING TO FLY

6.1 Local hobby rocket clubs

6.1.1 The best way to learn to fly a rocket is with the assistance of a local rocket club. Rocketry clubs in Australia have a history of responsible, safe operation and may be found in most major centres. Some model aircraft clubs may also be able to assist in learning to fly, particularly if you wish to fly radio controlled rocket gliders.

6.1.2 Details of clubs can be obtained from Associations listed in appendix G, or enquire at your local hobby store.

6.2 Learning to fly without a rocket club

6.2.1 It is not impossible to learn to fly without being a member of a club, but it can be difficult. It is suggested that you obtain a starter kit for your first rocket, these are specifically designed for beginners.

6.2.2 If you are unable to join a club to learn to fly, then try to get assistance from an experienced flier who should be able to help with your first efforts. This is particularly important if you wish to launch bigger rockets.

6.2.3 Appendixes A and B give basic advice on flying rockets.

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

7. LAUNCH SITE AND SAFETY CONSIDERATIONS

7.1 For the purposes of launch safety, model rockets have been divided into two classes - small model rockets, and model rockets other than small model rockets.

7.2 Small model rockets

7.2.1 When considering a launch site for flying small model rockets several factors need addressing. The launch site should;

- (a) be in a cleared area;
- (b) be free of tall trees;
- (c) be free of overhead power lines;
- (d) be free of buildings;
- (e) be free of dry brush and grass;

(f) be as large as is recommended in the following table;

Installed Total Impulse (Newton-seconds)	Minimum site Dimension (meters)
0-1.25	15
1.26-2.50	30
2.51-5.00	60
5.01-10.00	120
10.01-20.00	150

7.2.2 Consideration should be given to the effect on other persons in the vicinity of a launch site. For example, as model rockets have the potential to drift, it is not wise to launch small rockets near residential areas. School ovals are commonly used, however, a person would need to get permission from the school prior to launching from the oval.

7.2.3 When selecting potential launch sites, consideration should be given to the amount of low flying aircraft in the area. Where there is an obvious large amount of air traffic in a potential site it is wise to choose another. An easy step format has been developed for when you believe a suitable launch site is found;

Step 1 Obtain the permission of the land owner, whether it be government owned or privately owned.

Step 2 Check to determine whether there be objections from local government authorities in the area. There may be by-laws that affect operations of model rockets.

Step 3 Check that your model rocket falls into the category of a small rocket. If it does not you may need to follow the guidelines for large rockets.

It is usually easier to find a launch site by joining a club. Most of the work is already done.

7.3 Model rockets (other than small model rockets)

7.3.1 When considering a launch site for model rockets (other than small model rockets) a number of factors will need to be addressed. It is advisable to seek an area away from townships or built up areas. The same provisions that apply for small model rockets would also apply for larger rockets but with greater emphasis on restrictions in regulations.

7.3.2 Country areas would be ideal as a larger area would generally be needed. You would need to consider the 8km restriction from aerodromes with any potential sites. Also some sites may be unsuitable due to them being in restricted airspace. Controlled airspace may also start at very low heights in a potential launch site. This would need to be considered when assessing a site.

7.3.3 It is advisable to contact CASA and have a talk with a flying operations inspector to determine whether a potential site will be a problem for air traffic.

7.3.4 A site for large rockets would need to be at least as large as in the following table;

Installed Total impulse (Newton-seconds)	Site Dimension (meters)
20.01 - 40.00	300
40.01 - 80.00	300
80.01 - 160.00	300
160.01 - 320.00	500

7.3.5 Again, as with small model rockets, it is advisable to seek assistance from a club. Usually a club will already have a site available to fly a large rocket. Always read your instructions carefully before flying larger rockets. Read and follow the model rocket safety code for all operations of large rockets.

7.4 High power rockets

7.4.1 For high power rockets a launch site needs to very large. Areas such as a dry lake bed or deserted regions would need to be considered. The area would need to be at least as large as shown in the following table:

Total Impulse All Engines (Newton-seconds)	Equivalent Motor Type	Minimum Site Dimension (Meters)
320.01-640.00	I	750
640.01-1,280.00	J	2000
1,280.01- 2,560.00	K	2000
2,560.01-5,120.00	L	3000
5,120.01-10,240.00	M	5000
10,240.01-20,480.00	N	6000
20,480.01-40,960.00	O	8000

7.4.2 Only an area approved by CASA may be used to launch high power rockets. Approval would generally only be available to a club. The guidelines applicable to launch sites for high power rockets can be found in Appendix B.

7.4.3 Read and follow the high power safety code before all operations of high power rockets and ensure that all instructions are carefully followed.

8 LIAISON WITH AUTHORITIES AND SERVICES

8.1 Finding, sites for model rockets

8.1.1 It is best to fly at a site which has already been granted authorisation for flying model rockets rather than obtaining individual authorisation. The rocket associations listed in appendix G should be able to advise you of local sites. If there are no local sites available, the best places to look are those that are relatively unpopulated, well clear of airfields and free of air traffic. For advice on whether there is controlled airspace in any particular area, check with your local CASA office.

8.1.2 The operator of a model rocket is required to obtain authorisation before flying above 400ft in controlled airspace and within an 8km radius of an aerodrome. Clearance for flights within an 8km radius of a controlled aerodrome may be available from the local Air Traffic Services (ATS) unit for that area. The information you will need to provide is listed in Appendix C to CASR Part 101.

8.1.3 Flights within 8km of an uncontrolled aerodrome will need to be cleared by the aerodrome operator or a representative of the aerodrome users. However, you will still need to determine whether controlled airspace will be a factor in your planning.

8.2 Finding sites for high power rockets

8.2.1 Only an area designated by CASA may be used to launch high power rockets. As approval for a high power rocket site would normally only be available to a club, it is best to fly at a site which has already been granted authorisation for flying high power rockets rather than trying to obtain individual authorisation. The rocket associations listed in appendix G should be able to advise you of local sites.

8.2.2 If there are no local sites available, the best places to look are those that are well clear of any populated areas, well clear of airfields and free of air traffic. For advice on whether there is controlled airspace in any particular area, check with your local CASA office.

8.2.3 If regular activities are contemplated, it would be far better to establish a site for long-term use rather than seeking one-off authorisations. An approved site may have conditions, such as a height limit and times of use and there may be a requirement to notify the appropriate ATS unit when the site is actually being used.

8.3 Approved Operating Areas

8.3.1 CASR 101.035 allows CASA to designate certain areas as approved operating areas with specific limitations regarding their use. A rocketry organisation which has identified an area that it wishes to use as a permanent launching area, may request the local District Office of CASA to raise a NOTAM advising the permanent establishment of the approved operating area pending the insertion of the appropriate symbol on aviation charts.

8.4 NOTAMs

8.4.1 One purpose of a NOTAM is to disseminate information in advance of an activity which potentially presents a hazard to other users of airspace. It warns other users who may then wish to steer clear of a particular area, choose another time to fly or intensify their lookout for the hazard. It follows that a NOTAM must be issued sufficiently in advance of an activity so that other users of airspace are able to make use of the information contained in the NOTAM.

8.4.2 A NOTAM may only be issued by an 'Originating Authority'. Among the approved originating authorities are:

- (a) designated officers of CASA; and
- (b) operations officers of Approved Aviation Administration Organisations.

8.4.3 If a rocketry organisation has approval from CASA to administer its own operations, and conducts its operations in an approved area, the Operations Officer of that organisation may submit NOTAM details direct to the NOTAM Office using the form at Appendix F. For all other launch activities requiring the issue of a NOTAM, the organisation should submit the required details to the local CASA District Office who will then arrange for a NOTAM to be issued.

Bill McIntyre
Acting Assistant Director
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APPENDIX A MODEL ROCKETS (GENERAL)

1. BACKGROUND

1.1 Hobby rocketry was born in 1957 as a result of the first satellite being launched. Enormous public interest in rockets became apparent and excited young enthusiasts became involved in launching and making home made rockets.

1.2 This activity involved mixing of dangerous explosives and handling of experimental rocket motor devices by members of the general public and, during. This early period, serious injuries and fatalities occurred

1.3 Due to the wisdom of such people as Harry Stine, it became apparent that measures needed to control the experimental urges of the general public. This led to the evolution of model rocketry as we know it today. Models were developed utilising paper tubing , balsa wood and other materials using a pre-loaded factory made model rocket motor. No mixing of volatile explosives by the public was necessary. Model rocketry is now a safe sporting and recreational activity and a recognised educational tool.

2. FLYING SMALL MODEL ROCKETS

2.1 Small rockets are considered model rockets that weigh less than 500g and produce less than 20Ns total impulse. Check that your rocket falls within this category. If not, still read this section then go to Appendix B (Model rockets other than small model rockets).

2.2 Safety begins in the preparation stage of your rocket. Ensure that the model has been constructed according to instructions included in kits. It would not hurt to add extra glue to areas that may need reinforcing such as fins. Motor mounts are also an area requiring strength. Once you are satisfied with the structural integrity of your model it is time to move to the next stage.

2.3 Check to determine that you have all the necessary equipment to launch your model. On most occasions this involves a launch pad, electrical launch system (including safety key), recovery wadding (if the design of your rocket requires this) and your model rocket motors.

3. CHOOSE A SUITABLE LAUNCH AREA

3.1 Prepare your rocket for flight. You will first need to do the rocket pre-flight. This involves preparing your recovery device (i.e. parachute or streamer). Place the required amount of wadding. in the tube as recommended by your instructions. Be sure it fits loosely.

3.2 Then fold parachute or streamer as suggested by your instructions. Be sure to do this at the launch site not at home before you leave. Once this has been done, place the recovery device in the body tube loosely and insert the nose cone. (ensure the nose cone fits on loosely).

3.3 Prepare your motors for flight. Only use motors recommended in the instructions supplied with your kit.

WARNING: Never use home made motors or motors not recommended by the kit manufacturer. Home made motors would be considered an unauthorised explosive under state and territory explosives acts. This usually carries a mandatory \$10,000 fine! Furthermore such motors have been known to cause serious injury and death.

3.4 Separate the igniters and insert them in the motor. (it is important that the igniter touches the propellant when you do this) Fold the igniter over and then insert the plug which is supplied with the motors. Be sure not to insert this too hard as it may damage the igniter. If you do not have plugs use adhesive tape to hold the igniter in.

3.5 Insert the motor in the rocket ensuring it is in the retaining hook. If you do not have a hook, use masking tape wrapped around the motor to ensure a tight fit. This is particularly important to ensure your recovery device works.

3.6 Place the model on the launch pad (ensure it slides loosely on the launch rod) and hook up the micro clips as recommended by your instructions. (be sure the safety key is not inserted while you do this)

3.7 Check the weather for your flight. It is best to launch only during calm weather with little or no wind and good visibility. If in doubt, do not launch. It is better not to launch than take the risk of losing your model.

3.8 It may be necessary to angle the launch rod (not more than 30 degrees from the vertical) into the wind to ensure the model lands within the launch site.

- (1) Move back from your rocket as far, as the launch wire will permit (at least 5 meters).
- (2) Insert safety key to arm the launch controller.
- (3) Observe and listen for any aircraft before beginning your audible countdown. (if an aircraft is spotted wait for it to be well clear).
- (4) Give audible countdown (be sure-everybody in the vicinity can hear you) 5,...4,....3,...2,...1,...LAUNCH! (never say fire, only say fire if there is one).

Push and hold launch button until motor ignites.

- (5) Remove safety key from launch controller. Replace safety cap on launch rod.

MISFIRES: FAILURE OF THE MODEL ROCKET MOTOR TO IGNITE IS NEARLY ALWAYS CAUSED BY INCORRECT IGNITER INSTALLATION.

PROCEDURE

When an ignition failure occurs:

- (1) Remove the safety key from the launch control system.
- (2) Wait one minute before approaching the rocket.
- (3) Remove the expended igniter from the motor and install a new one as suggested previously.

FOR YOUR SAFETY AND ENJOYMENT READ AND FOLLOW the model rocket safety code while participating in any model rocket activities.

4. FLYING MODEL ROCKETS OTHER THAN SMALL MODEL ROCKETS

4.1 A model rocket (other than a small model rocket) is considered to be a model rocket which weighs between 500g and 1500g, has less than 125grams of propellant and produces between 20Ns and 320Ns total impulse of power.

4.2 Check to determine whether your kit comes under this category. If it does not then you may be under the category of high power rocketry. (see Appendix B)

4.3 Read all the guidelines for small rockets as these apply again for large rockets. However, there should be much more emphasis on construction strength and integrity when building a larger rocket. Greater power means stronger construction. It is advisable to consider using two part epoxy in construction of a large model rocket kit.

4.4 Before flying your model rocket, be sure to comply with all applicable CASA regulations. You may need to follow guidelines in Subpart D with notification requirements.

4.5 Also be sure you are complying with applicable state and territory explosives regulations and local government by-laws if applicable.

4.6 When flying your model rocket a greater emphasis is needed on safety.

- (1) Be sure you are at least 10 meters from the launch pad before ignition sequence.
- (2) Read and follow instructions very carefully before launching your large rocket.
- (3) Be sure all spectators are aware of any impending launch.
- (4) Be sure to observe and listen for any aircraft before launching. Even if CASA has been notified, this does not guarantee aircraft will not be in the area.
- (5) Read and follow the model rocket safety code prior to any activity involving large rockets.

APPENDIX B HIGH POWER ROCKETS (GENERAL)

High power rockets utilise motors which are capable of propelling a rocket to altitudes in excess of 20,000ft at extremely high velocities. The motors and rules for handling are governed in each State by relevant State government legislation pertaining to mines, explosives etc.

Potential operators of high power rockets would be required to undertake certification prior to being permitted to operate such rockets. Certification would be in two steps administered by an Approved Aviation Administration Organisation.

Step 1 would be an examination covering construction, handling, storage, operation, safety, and legislation. Step 2 would be flight trials as follows:

LEVEL	FLIGHT TEST	PRIVILEGE
H	Fly a "H powered" Rocket successfully (Minimum 200 NS)	Purchase and Fly H, (320) NS power rocket motors
I	Fly a "I powered" Rocket successfully (Minimum 400 NS)	Purchase and Fly I,(640) NS power rocket motors
J/K	Fly a "J powered" Rocket successfully (Minimum 1280 NS)	Purchase and Fly J or K (to 2560 NS) power rocket motors
L	Fly a "LH powered" Rocket successfully (Minimum 5120 NS)	Purchase and Fly L to O (up to 40960 NS) power rocket motors
COMPLEX	Fly a cluster or staged Rocket successfully	Fly clustered or staged rockets up to attained level of proficiency. Example: cluster of two "H" motors for the "I" complex certification

Upon satisfactory completion of both steps, a person will be awarded a certificate for the level achieved.

A person would not be permitted to fly a high power rocket without providing evidence of appropriate certification to the Range Safety Officer. Certification by a recognized foreign High Power Rocketry organization such as the National Association of Rocketry, the Canadian Association of Rocketry or Tripoli Rocketry Association would normally be acceptable

APPENDIX C RELEVANT LEGISLATION

Hobby rocketry is covered in CASR Part 101 Unmanned Aircraft and Rockets. Provisions which relate to rocketry are listed below.

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) a small balloon within 100 metres of a structure and not above the top of the structure; or
 - (d) an unmanned tethered balloon that remains below 150 feet above ground level; or
 - (e) 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.

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 Approved 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.

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) the 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 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.

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 H Rockets

101.415 Applicability of this Subpart

This Subpart applies to the operation of rockets of all kinds, except rockets mentioned in paragraph 101.005 (3) (f).

Note 1 That is, this Subpart does not apply to a firework rocket not capable of rising more than 400 feet above ground level. See r 101.005 (3) (f).

Note 2 **Rocket** in this Subpart does not include a rocket-powered aircraft — see the definition in regulation 101.410.

101.420 Application of State and Territory laws about rockets

- (1) If a law of a State or Territory deals with the operation or use of rockets, and is not inconsistent with this Subpart, nothing in this Subpart affects the operation of the law.
- (2) For subregulation (1), a law of a State or Territory is not inconsistent with this Subpart if it is possible to comply with both this Subpart and the State or Territory law at once.

101.425 Definitions for Subpart

In this Subpart:

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

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).

high power rocket means a rocket that is not a model rocket, and to avoid doubt, includes:

- (a) a sounding rocket; and
- (b) a sub-orbital rocket, and
- (c) a launch vehicle (within the meaning given by the *Space Activities Act 1998*).

model rocket means a rocket that:

- (a) weighs no more than 1 500 grams; and
- (b) carries no more than 125 grams of propellant; and
- (c) produces no more than 320 newton-seconds of impulse; and
- (d) is made of balsa, wood, paper or plastics or a combination of those materials, but contains no metal as structural parts.

rocket does not include a rocket-powered or rocket-assisted aircraft.

101.430 Launching rocket in or over prohibited or restricted area

- (1) A person must not launch a rocket (including a model rocket) 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.

101.435 **Launching rockets into controlled airspace**

A person must not launch a rocket (including a model rocket) to higher than 400 feet AGL in controlled airspace, except:

- (a) in an approved area; or
- (b) in accordance with an air traffic control clearance.

Penalty: 50 Penalty units.

Note 1 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)

101.440 **Launching rockets near aerodromes**

- (1) A person must not launch a rocket (except a small model rocket) to higher than 400 feet AGL within 3 nautical miles of an aerodrome unless:
- (a) doing so is permitted by another provision of this Part; or
 - (b) permission has been given for the operation under regulation 101.445.

Penalty: 25 Penalty units.

Note 1 **AGL** = above ground level (see the Dictionary). For **model rocket**, see regulation 101.425.

Note 2 Some special provisions apply to model rockets — see regulation 101.455.

- (2) In subregulation (1):
small model rocket means a model rocket that weighs less than 500 grams and either:
- (a) uses no more than 25 grams of propellant; or
 - (b) produces no more than 20 newton-seconds of impulse.
- (3) A person must not launch a rocket (including both a small model rocket and any other model rocket) from or over an area mentioned in paragraph (4) (a) or (b) unless:

- (a) doing so is permitted by another provision of this Part; or
- (b) permission has been given for the operation under regulation 101.445.

Penalty: 25 Penalty units.

- (4) The areas for subregulation (3) are:
 - (a) a movement area or runway of an aerodrome; and
 - (b) the approach or departure path of a runway of an aerodrome.

101.445 Getting permission for launch of rocket near aerodrome

- (1) The authority that must give permission for regulation 101.440 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 the relevant authority mentioned in subregulation (1) the information set out in Table 101.445, so far as relevant to the proposed launch.

Table 101.445 Details of launching of a rocket to be given to CASA

Item	Information to be provided
1.	The name, address and telephone number of the person who will launch the rocket (or, if several people will be involved, the name, address and telephone number of the person who will coordinate the launching)
2.	The date and time the rocket is to be launched
3.	Where it is to be carried out
4.	The size and mass of the rocket
5.	The estimated greatest altitude or flight level that the rocket will reach
6.	If more than 1 rocket is to be launched at a time, how many rockets are to be launched at the time
(3)	If more than 1 rocket is to be launched at a time, such a requirement is a requirement to give the information about each such launch.
(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 101.030 (1) (a) or (b).
(5)	An authority mentioned in subregulation (1) may impose conditions on a 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 points.

101.450 High power rockets

- (1) A person must not launch a high power rocket, or permit a high power rocket to be launched, except in an approved area.

Penalty: 10 Penalty units.

Note 1 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)

Note 2 For *high power rocket*, see regulation 101.425.

- (2) A person must not launch a high power rocket, or permit a high power rocket to be launched, unless the person gives the details listed in the table following subregulation 101.445 (2) to CASA at least one working day before the intended time of the launch.

Penalty: 10 Penalty units.

Note A person can comply with this requirement by telling:

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

See regulation 101.035.

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

101.455 Maximum operating height of rockets

A person must not launch a rocket (except a model rocket) to higher than 400 feet AGL except:

- (a) in an approved area; or
- (b) as otherwise permitted by this Part.

Penalty: 10 Penalty units.

Note 1 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)

101.460 Dropping or discharging of things from rockets

A person must not cause anything to be dropped or discharged from a rocket in a way that creates a hazard to an aircraft.

Penalty: 25 Penalty units.

101.465 Weather and day limitations — rockets other than model rockets

(1) A person may launch a rocket that is not a model rocket:

- (a) in or into cloud; or
- (b) at night;
- (c) in conditions other than VMC.

Only in as permitted by another provision of this Part, or in accordance with an air traffic control clearance.

Penalty: 10 Penalty units.

Note For *model rocket*, see regulation 101.425.

(2) However, subregulation (1) does not prevent rockets being operated as part of a firework display.

101.470 Model rockets

(1) A person must not launch a model rocket into cloud.

Penalty: 10 Penalty units.

Note For *model rocket*, see regulation 101.425.

(2) A person must not launch a model rocket to higher than 400 feet AGL within 5 nautical miles of an aerodrome.

Penalty: 10 Penalty units.

(3) Subject to subregulations (1) and (2) and Subpart B, a person may launch a model rocket outside an approved area, or at night.

Further legislative requirements concerning hobby rockets may exist under state and territory explosives acts and also local government acts (including fire services acts).

APPENDIX D

MODEL ROCKETRY SAFETY CODE

This code is based upon the official model rocket safety code of the National Association of Rocketry Approved in November 1991. It has been modified to reflect Australian legislative requirements.

1 Materials. My model rocket will be made of lightweight materials such as paper, wood, rubber, and plastic suitable for the power used and the performance of my model rocket. I will not use any metal for the nose cone, body or fins of a model rocket.

2 Motors. I will use only commercially-made, NAR certified model rocket motors in the manner recommended by the manufacturer. I will not alter the model rocket motor (engine), its parts or its ingredients in any way.

3 Recovery: I will always use a recovery system in my model rocket that will return it safely to the ground so it may be flown again. I will use only flame resistant recovery wadding if wadding is required by the design of my model rocket.

4 Weight and power limits: My model rocket will weigh no more than 1500 grams at lift off and its rocket motor(s) will produce no more than 320 Newton-seconds of total impulse. My model rocket will weigh no more than the motor manufacturers recommended maximum lift-off weight for the motors used, or I will use motors recommended by the manufacturer for my model rocket.

5 Stability: I will check the stability of my model rocket before its first flight, except when launching a model rocket of already proven stability.

6 Payloads Except for insects, my -model rocket will never carry live animals or a payload that is intended to be flammable, explosive, or harmful.

7 Launch site: I will launch my model rocket outdoors in a cleared area, free of tall trees, power lines, buildings, and dry brush and grass. My launch site will be at least as large as that recommended in the following table.

Launch site dimensions

INSTALLED	EQUIVALENT	SITE
TOTAL IMPULSE	MOTOR TYPE	DIMENSION
(Newton-seconds)		(meters)
0-1.25	¼ A & ½ A	15
1.26-2.50	A	30
2.51-5.00	B	60
5.01-10.00	C	120
10.01-20.00	D	150
20.01-40.00	E	300
40.01-80.00	F	300
80.01-160.00	G	300
160.01-320.00	2G	500

8 Launcher: I will launch my model rocket from a stable device that provides rigid guidance until the model rocket has reached a speed adequate to ensure a safe flight path. To prevent accidental eye injury, I will always place the launcher so the end of the rod is above eye level or I will cap the end of the rod when approaching it.

I will cap or disassemble my launch rod when not in use and I will never store it in an upright position. My launcher will have a jet deflector device to prevent the motor exhaust from hitting the ground directly. I will always clear the area around my launch device of brown grass, dry weeds, or other easy-to burn materials.

9 Ignition system: The system I use to launch my model rocket will be remotely controlled and electrically operated. It will contain a launching switch that will return to "off" when released. The system will contain a removable safety interlock in series with the launch switch. All persons will remain at least 5 meters from the model rocket when I am igniting model rocket motors totalling 30 Newton-seconds or less of total impulse and at least 10 meters from the model rocket when I am igniting model rocket motors totalling more than 30 Newton-seconds of total impulse. I will use only electrical igniters recommended by the motor manufacturer that will ignite model rocket motor(s) within one second of actuation of the launching switch.

10 Launch safety: I will ensure that people in the launch area are aware of the impending model rocket launch and can see the model rocket's lift-off before I begin my audible five-second countdown. I will not launch a model rocket so that its flight path will carry it against a target. If my model rocket suffers a misfire, I will not allow anyone to approach it or the launcher until I have made certain that the safety interlock has been removed or that the battery has been disconnected from the ignition system. I will wait one minute after a misfire before allowing anyone to approach the launcher.

11 Flying conditions: I will launch my model rocket only when the wind is no more than 30 kilometres per hour. I will not launch my model rocket so it flies into clouds, near aircraft in flight, or in a manner that is hazardous to people or property.

12 Pre-launch test. When conducting research activities with unproven model rocket designs or methods, I will, when possible, determine the reliability of my model rocket by pre-launch tests. I will conduct the launching of an unproven design in complete isolation from persons not participating in the actual launching.

13 Launch angle: My launch device will be pointed within 30 degrees of vertical. I will never use model rocket motors to propel any device horizontally.

14 Recovery hazards: If a model rocket becomes entangled in a power line or other dangerous place, I will not attempt to retrieve it.

APPENDIX E

HIGH POWER SAFETY CODE

This is the official high power safety code which was approved by the National Association of Rocketry in July 1995 modified to reflect Australian legislative requirements. Where the code referred to the Federal Aviation Administration (FAA) it now refers to CASA. Feet have been changed to meters and miles per hour has been changed to kilometres per hour.

1 Certification: I will fly high power rockets only when certified to do so by an organisation approved under CASR 149 to administer high power rocketry operations.

2 Operating Clearance: I will fly high power rockets only in compliance with Civil Aviation Safety Regulations (CASRs) and all other federal, state, and local laws, rules and regulations.

3 Materials: My high power rocket will be made of lightweight materials such as paper, wood, rubber, and plastic, or the minimum amount of ductile metal suitable for the power used and the performance of my rocket.

4 Motors: I will use commercially-made NAR certified rocket motors in the manner recommended by the manufacturer. I will not alter the rocket motor, its parts, or its ingredients in any way.

5 Recovery: I will always use a recovery system in my high power rocket that will return it safely to the ground so it may be flown again. I will use only flame resistant recovery wadding if wadding is required by the design of my rocket.

6 Weight and power limits: My rocket will weigh no more than the motor manufacturer's recommended maximum lift-off weight for the motors used, or I will use motors recommended by the manufacturer of the rocket kit. My high power rocket will be propelled by rocket motors that produce no more than 40,960 Newton-seconds of total impulse.

7 Stability: I will check the stability of my high power rocket before its first flight, except when launching a rocket of already proven stability.

8 Payloads: My high power rocket will never carry live animals (except insects) or a payload that is intended to be flammable, explosive, or harmful.

9 Launch site: I will launch my high power rocket outdoors in a cleared area, free of tall trees, power lines, buildings, and dry brush and grass. My launcher will be located at least 500 meters from any occupied building or public highway. My launch site will have minimum dimensions at least as great as those in the launch site dimension table. As an alternative, the site's minimum dimension will be one-half the maximum altitude of any rocket being flown, or 500 meters, whichever is greater. My launcher will be no closer to the edge of the launch site than one-half of the minimum required launch site dimension.

Launch site dimensions

Total Impulse All Engines (Newton-seconds)	Equivalent Motor Type	Minimum Site Dimension (Meters)
160.01-320.00	H	500
320.01-640.00	I	750
640.01-1,280.00	J	2000
1,280.01- 2,560.00	K	2000
2,560.01-5,120.00	L	3000
5,120.01-10,240.00	M	5000
10,240.01-20,480.00	N	6000
20,480.01-40,960.00	O	8000

10 Launcher: I will launch my high power rocket from a stable launch device that provides rigid guidance until the rocket has reached a speed adequate to ensure a safe flight path. To prevent accidental eye injury, I will always place the launcher so the end of the rod is above eye level or I will cap the end of the rod when approaching it. I will cap or disassemble my launch rod when not in use and I will never store it in an upright position. My launcher will have a jet deflector device to prevent the motor exhaust from hitting the ground directly. I will always clear the area for a radius of 3 meters around my launch device of brown grass, dry weeds, or other easy-to-burn materials.

I will not launch my high power rocket so that its flight path will carry it against a target. My launch device will be pointed within 20 degrees of vertical. I will never use model rocket motors to propel any device horizontally.

11 Ignition system: The system I use to launch my high power rocket will be remotely controlled and electrically operated. It will contain a launching switch that will return to 'off' when released. The system will contain a removable safety key interlock in series with the launch switch. All persons will remain at a distance from the high power rocket and launcher as determined by the total impulse of the installed rocket motor(s) according to the accompanying Safe Distance Table.

Safe distance table

Total Impulse Engines (Newton-seconds)	All Equivalent Type	Motor	Minimum Distance From Rocket With Single Motor (Meters)	Minimum Distance From Rocket With Multiple Motors (Meters)
160.01-320.00	H		30	60
320.01-640.00	I		60	100
640.01-1,280.00	J		60	100
1,280.01- 2,560.00	K		60	100
2,560.01-5,120.00	L		100	150
5,120.01-10,240.00	M		200	300
10,240.01-20,480.00	N		300	500
20,480.01-40,960.00	O		300	500

12 Launch safety: I will ensure that people in the launch area are aware of the impending high power rocket launch and can see the rocket's lift-off before I begin my audible five-second countdown. If my high power rocket suffers a misfire, I will not allow anyone to approach it or the launcher until I have made certain that the safety interlock has been removed or that the battery has been disconnected from the ignition system. I will wait five minutes after a misfire before allowing anyone to approach the launcher. I will ensure that adequate fire control apparatus (class A fire extinguisher or minimum of 20 litre of water) is readily available.

13 Flying conditions: I will launch my model rocket only when the wind is no more than 30 kilometres per hour. I will not launch my model rocket so it flies into clouds, near aircraft in flight, or in a manner that is hazardous to people or property.

14 Recovery hazards: If a model rocket becomes entangled in a power line or other dangerous place, I will not attempt to retrieve it.

APPENDIX F SAMPLE NOTAM REQUEST

NOTIFICATION OF ROCKETRY ACTIVITY	
Reference No./.../19....
To Australian NOTAM Office	Phone (07) 3866 3647 Fax.....(07) 3866 3553
Please tick relevant boxes	
TIME	UTC WST CST EST Other
	Please advise
Purpose of Report	PROVIDE NEW INFORMATION DETAILED BELOW <input type="checkbox"/> CANCEL PREVIOUS ADVICE Ref (NOTAM No) <input type="checkbox"/> Date <input type="checkbox"/> EXTEND PREVIOUS ADVICE Ref (NOTAM No) <input type="checkbox"/> Date <input type="checkbox"/> toam/pm on .../.../9....
Period of Validity	From (DATE/TIME)
	ToEstimated (if finish time uncertain) * Note: If time estimated contact NOTAM OFFICE at least 2 hours before estimated duration time and advise if NOTAM is to be extended or cancelled.
	Daily duration or time schedule (if applicable) From am/pm to am/pm
Text	Contact Officer:..... Location of Activity:..... Number of Rockets to be Launched:..... Class and Weight of Rockets:..... Maximum Altitude of Operation:..... Please FAX copy of NOTAM to originator. Fax No.
<u>Originating Officer</u>	
Signed	Contact No: (phone).....
Printed Name.....	(Fax).....
Approved Organization.....	
For NOTAM OFFICE only	
NOTAM No. C	B INITIALS

APPENDIX G**USEFUL ADDRESSES AND TELEPHONE NUMBERS**

Civil Aviation Safety Authority
GPO box 2005
Canberra City ACT 2601 Ph 131 757
Australia Fax (02) 6217 1444
Safety education infoline (Freecall) Ph 1800 676 063

Australian Rocketry Association Inc Ph (08) 8278 2270
PO box 777
Marlestone
South Australia 5046

Adelaide Advanced Rocketry Club Inc Ph (08) 8265 5604
7 Welkin Crt Fax (08) 8265 5604
Modbury North
South Australia 5092

Marion Model Rocket Club Inc

To be advised

Model Aeronautical Association of Australia Inc Ph (03) 9740 8736
6 Coppelius Close Fax (03) 9740 9585
Sunbury
Victoria 3429

National Association of Rocketry Ph 1 (800) 262 4872
PO box 177 Fax 1 (715) 832 6432
Altoona, WI 54720

New South Wales Rocketry Association

To be advised

Ignatius Rocket Club Ph (08) 8331 3515
15 Williams Ave
Saint Morris
South Australia 5068