Cardiff Model Aircraft Club

Trelai Risk Assessments

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Introduction

This document is a risk assessment for Cardiff Model Aircraft Club (CMAC) flying unmanned vehicles at Trelai Park, Ely, Cardiff, for which the club holds a licence from Cardiff Council to fly unmanned vehicles.

All members of CMAC must fly lawfully in line with the Governments Air Navigation Order (ANO) Articles relating to unmanned flying vehicles.

All members of CMAC must be members of the British Model Aircraft Club (BMFA) and therefore fly within the BMFA authorisation (Article 16) from the Civil Aircraft Authority (CAA) which allows for a number of variations from ANO such as flying above 400 feet and 30m from uninvolved people or 50m from assemblies of people.

Note: Trelai Park is used for sport activity such as football and rugby when assemblies of people will be present. The park is also used for smaller groups or individuals taking part in exercise, dog walking or other pleasure activities.

A goggle map of the park has been included below as a reference to identify higher risk areas which have been highlighted within red boxes.

The map above shows a school to the west (left) of the field, car park, buildings, golf, tennis courts and allotment gardening to the North (top) of the field and major road to the south (bottom) of the field.

Outline Risks of Radio Controlled Model Aircraft

There is a risk of personal injury or loss of life caused by Radio Controlled Model Aircraft electronic malfunction, physical model failure or pilot in command error.

There is a risk of damage to property caused by Radio Controlled Model Aircraft electronic malfunction, physical model failure or Pilot in Command error.

The tables at the end of this document are used to score the risks both before and after controls are implemented to reduce the risk to tolerable levels.

Tables are: Risk Severity, Likelihood and Tolerance.

Risk Score before controls are implemented

There is a risk of personal injury or loss of life

A model aircraft or part of model aircraft colliding with a person could cause death or serious injury giving a severity of **hazardous** or **catastrophic**.

The likelihood of a model aircraft having an electronic malfunction, physical failure or pilot in command error occurs **occasionally** and sometime **frequently**.

These severity and likelihood classifications makes these risk **unacceptable** without any controls applied.

There is a risk of damage to property

A model aircraft or part of model aircraft colliding with property could cause property damage and in some cases **major** damage.

The likelihood of a model aircraft having an electronic malfunction, physical failure or pilot in command error occurs **occasionally** and sometime **frequently**.

These severity and likelihood classifications makes these risk **unacceptable** without any controls applied.

Controls to reduce the severity of an incident.

The severity of a model aircraft or part of a model aircraft colliding with a person or property can be reduced by limiting the type, size and weight of a model; therefore the following controls must be implemented.

- Gas Turbine model **MUST NOT** be flown at Trelai Park
- Models in excess of 2.5kg **MUST NOT** be flown at Trelai Park

The above controls will reduce the severity of a collision to **Major** or **Minor**

These controls alone would not bring the the risks into an acceptable tolerance level.

Controls to reduce the likelihood of an incident

The likelihood of a model aircraft or part of a model aircraft colliding with a person or property can be reduced by avoiding areas of high concentration of people or property; therefore the following controls must be implemented.

- No flying if sporting activities such as football or rugby or any other activity when assemblies of people are present.
- Pilot in command must always fly with their back to the car park situated to the north side of the park and at least 30 meters from that car park. No flying above or behind the pilot in command.
- Pilot in command must not take off or land within 15m of uninvolved people and must maintain 30m separation when flying. Note: if a non CMAC member of the public approaches and talks to the pilot in command they become involved and must be told the dangers of a model collision with them and the requirement to stay behind the pilot in command especially when landing or taking off.
- Pilot in command must not fly outside the boundary of the park taking great care to avoid the school the the west of the park and not fly within the red boxes marked on the park plan included earlier in this document.

The above controls will reduce the likelihood of a collision to **Remote** or **Improbable**

These controls would bring the these risks down to the **boundary of acceptable tolerance** level but still **not be low enough**; however with the addition of pre and post flight checks, as specified by BMFA, the likelihood of model aircraft or part model aircraft colliding with a person or property would reduce to **improbable** or extremely **improbable**.

These checks have been included below.

Pre Flying Session Model Checks On arrival at the flying site:

- Check airframe for any transit damage.
- Check that servos and linkages are secure.
- Check undercarriage for secure fixing and correct alignment.
- Check propeller for damage and secure fixing.
- Check receiver aerial for damage and, with 2.4 GHz equipment, that the orientation is correct.
- Carry out a range check.
- Carry out a fail safe check and make sure all controls move to expected positions, engine power to minimum.
- Check that the receiver and transmitter batteries have sufficient capacity for the intended use.

Checks Before Each Flight:

- Check the correct model is selected on the transmitter.
- Check that all controls operate freely and do not bind or stick at any point in their movement.
- Check that all controls move in the correct sense. For conventional models, from behind the model check, for; Elevator stick back – Elevator comes up. Aileron stick right – Right hand aileron comes up. Rudder stick right – Rudder moves to the right.
- 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.
- Check transmitter and receiver battery capacity is sufficient for the intended flight with an added safety factor.
- **With i/c models (liquid fuel or gas)**
  - 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 electric models**
  - The first and most important principle of electric flight ground safety is to understand that the instant you start to plug in the flight battery, the model you are holding may transform itself from a dead airframe into one with its motor running at full revs and all controls moving. No matter how good the other safety checks, the pilot must be prepared for this to happen every single time the flight battery is connected. If a separate receiver battery is fitted then the opportunity to check the operation of the radio equipment before the flight battery is plugged in.
  - Since plugging in the flight battery is nearly always a two-handed job serious thought to how your model will be restrained BEFORE it does something unexpected. When plugging in, positive restraint, either by a helper holding the model or by some other method, and staying completely clear of the propeller must always be part of the regular routine.
  - Electric motors have very different power and torque characteristics to normal IC model engines. Great care when setting up their control systems and handling them as an accident, such as the propeller hitting a hand, which would stall a glow engine, might just make an electric motor turn even harder.
- Just before flight, DOUBLE CHECK that all transmitter trims, rate switches, mixers etc. are in their correct positions and that the transmitter meter is 'in the green' and that the correct model is selected and aerial is extended.
- Finally, with the aircraft held securely (usually on the ground for i/c models but not if the fail safe is set to retract the undercarriage), open up to full power and re-check all flying controls again for full and free movement, also noting any glitches, hesitations or odd vibrations. At this point also switch off the transmitter and make sure that the failsafe works properly as expect. If ANYTHING seems odd, **DO NOT FLY**

- Be S.M.A.R.T. with transmitter. S .... Switch on M .... Model selected is correct / Meter in the Green A .... Aerial secure / extended R .... Rate switches all in correct positions T ..... Transmitter voltage good and Trims all in correct positions. Failsafe working.

Checks After Each Flight

- Receiver OFF then transmitter OFF (Unless your equipment manufacturer specifies otherwise).
- Clean the aircraft down.
- Check propeller, airframe, undercarriage, wing fixing etc. for security of fastening and for possible flight or landing damage.

Risk Severity Table

Severity of Consequences		
Definition	**Meaning**	**Value**
Catastrophic	Death or property destruction	5
Hazardous	Serious life affecting injury or major property damage	4
Major	Serious injury or property damage	3
Minor	Minor injury of property damage	2
Negligible	Nuisance of little consequence	1

Risk likelihood Table

Likelihood of Occurrence		
Definition	**Meaning**	**Value**
Frequent	Likely to occur every flying session	5
Occasional	Likely to occur monthly	4
Remote	Likely to occur once every six months	3
Improbable	Unlikely to occur but possible	2
Extremely improbable	Very unlikely to occur	1

Risk Tolerance Matrix

Likelihood of Occurrence	**Severity of Consequences**				
	Catastrophic	Hazardous	Major	Minor	Negligible
Frequent	Unacceptable	Unacceptable	Unacceptable	Review	Review
Occasional	Unacceptable	Unacceptable	Review	Review	Review
Remote	Unacceptable	Review	Review	Review	Acceptable
Improbable	Review	Review	Review	Acceptable	Acceptable
Extremely improbable	Review	Review	Acceptable	Acceptable	Acceptable