

MMRCA



Pilot Training Guide

Student Flight Guide for Mid-Missouri Radio Control Association

Much of the material comes from the

*Propmasters RC Club
Naperville, Illinois*

*We have made changes appropriate to Mid Missouri Radio Control Associations
situation and needs*

RADIO CONTROL AIRPLANE FIRST FLIGHT

Never fly alone.

Keep hands and face out of propeller arc.

DO NOT LEAN OVER A RUNNING ENGINE TO ADJUST ANYTHING.

Never fly over houses. near or over people or power lines.

Rubber bands can lose their hold in very cold weather.

Be careful with loose clothing. around a running engine.

Sand the edges of a new nylon propeller to move the sharp edge.

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1. You will need field equipment

You will need a set of equipment to support you aircraft. The typically include:

- A fuel **pump** to move fuel from you storage container into the aircraft.
- A supply of **rubber bands**. Most trainers used rubber band to attach the wing to the fuselage. For safety these are usually used only one or two days.
- A **glow heater**. If you are flying a glow fuel engine, which is the most common on trainers, you will need a way to heat up the glow plug. This is a battery in a special container.
- An **engine starter**. This can be a stick used to flip the propeller or an electric motor to turn the motor.
- Supply of **propellers**. The do break and it is nice to have spares so that you can continue to fly after breaking one.
- **Volt meter**. The radio receiver has a battery and must be check through the day.
- **Battery charger**. This usually come with your radio system for charging your receiver battery and transmitter battery at home.
- **Window cleaner** and **paper towels**. Model aircraft fuel is typically 18 % oil to protect the engine. This oil comes out in the exhaust and some get attached to the surfaces of the aircraft. You will need these to clean up at the end of the day.
- **Assorted tools**.
- **Box** to carry all this equipment.

If you opt for electric power the equipment change a little. You will not need the fuel pump, glow heater or engine starter. You will need the other equipment. Additionally, you will need:

- A **Field charger**. A fast battery charger that runs off a 12 volt battery.
- A **12-volt battery**. Some people run this off their car or other have separate batteries.
- **Extra power batteries**. Fast charging usually take about 30 minute and electric flight are from 5 to 15 minutes. You will need a set to be charging while you are flying the other set.

2. Preflight Assembly.

A. Plug the aileron servo lead into the receiver connection.

B. For rubber banded wings use at least 12 #64 rubber bands to hold the wing to the fuselage. Place four on each side running front to back. The last four should be placed, two from right front to left back and two from left front to right back thus forming an 'X' across the top of the wing. These rubber bands must go under the servo and linkage arms, if they are exposed. You should note that rubber bands are fuel sensitive and should be replaced often. Consider starting each flying session with a new set. Your plane can become very hard to control if the wing comes loose or falls off.

3. Preflight Check.

A. Perform a radio check. Turn on the transmitter then the receiver in the plane. With the antenna on the transmitter pushed in, walk away from the plane until you are at least 25 to 30 feet away. As you are walking away operate the transmitter sticks. The aircraft control surfaces should move smoothly without chatter. If chatter or twitching occurs the batteries may not be charged enough to fly or there is outside interference. In either case DON'T FLY.

B. Check that the control surfaces move smoothly and have not been reversed. The right stick when pulled back should move the elevator up, pushed forward the elevator moves down. Move the right stick to the right and the right aileron should move up and the left one down. Move the same stick to the left and the left aileron should move up and the right one down. Move the left stick forward and the engine throttle should open, pull it back to close. Move the left stick to the right and left the rudder and nose wheel should follow. Give each control surface a pull, none should come loose.

C. Next check that the trim-tabs on the radio are in the center position. Once the aircraft has been trimmed, the control surfaces should be set so that they are in the position they were trimmed at when the trim tabs are centered. It may take several flights to correct these adjustments.

D. Finally, loop a string or cord over the tail and under the rear stabilizers of the aircraft and fasten it to a stake, using an old screw driver or stake, driven into the ground. This will keep the plane from running away when the engine is running if the throttle is accidentally advanced. You are now ready to start the engine.

4. Starting the aircraft.

A. Begin by fueling the aircraft. Disconnect the pressure vent fuel tube from the muffler. Next disconnect the fuel line from the carburetor. This is the line that is used to fill the tank. It is also the line you will use to empty the tank when the days' flying is complete. Begin to fill the tank. When the tank is full, fuel will begin to come out the tank pressure vent line, this is the one that was connected to the muffler. When fueling is completed, reconnect the fuel line to the carburetor and the pressure vent line to the muffler. You should note that some tanks come with three lines, a fuel line, a pressure line and a fill line.

B. Once the plane has been fueled; you are now ready to start the engine. First turn on the transmitter and then receiver. **DO NOT CONNECT THE GLOW PLUG TO THE BATTERY AT THIS TIME.** Set the throttle to full open, left stick full forward. Next place a finger over the carburetor and turn the propeller by hand until you see fuel coming to the engine. Now place the throttle stick all the way back (close) and set the throttle trim tab full forward. This is the position you should be in to start the engine. Attach the glow plug to the battery or glow plug driver and using a chicken stick or electric starter spin the propeller counterclockwise until the engine starts. If the engine fails to start, you may need to advance the throttle a little and try again.

5. Adjusting the Carburetor.

A. Once the engine is started you now need to adjust the carburetor. ALL ADJUSTMENT SHOULD BE MADE FROM BEHIND THE PROPELLER, DO NOT REACH OVER THE PROP TO ADJUST ANYTHING. Follow the directions that came with the engine to adjust the carburetor. Some engines, such as a FOX, have a low speed adjustment on the muffler side of the engine. With this type of engine you need to adjust the high speed side first then the low speed side. To adjust the high speed, with the throttle set at full, adjust so that the engine is running at peak power. Then open up the adjustment two or three clicks. The low speed side should be adjusted so that the idle is smooth and the transition from idle to full power goes smoothly without bogging down or stalling. When the carburetor is adjusted correctly, you should be able to quickly pinch the fuel line closed and quickly release it and the engine should not slow or quit, in **fact it should speed up** briefly. Another way to tell when the carburetor is adjusted correctly is to hold the aircraft vertically for 15 or 20 seconds **with the engine at full throttle**. The engine should not change speed. When doing this the propeller arc should be above the heads of those holding and adjusting.

B. Once the carburetor has been adjusted, it is time to set the engine idle. With the engine running adjust the throttle trim tab so that the engine idles smoothly and slows when the throttle (left stick) is pulled all **the** way back. When the throttle is set properly, you should be able to stop the engine by pulling the throttle and the throttle trim tab all the way back. Again this may take a few attempts to get right.

6. Take Off.

A. With the engine running, check the control surfaces again. The control surfaces should move smoothly without chatter. If they are chattering or twitching **DON'T FLY**. You may have a radio problem. This problem can also be caused by metal to metal vibration or a badly insulated or broken receiver. DON'T FLY until the problem is corrected.

B. Once the engine is running properly place the aircraft on the down wind end of the field. The airplane should be facing into the wind as it travels down the field. *RIC* models, like real aircraft, work best taking off and landing into the wind. After all, the same laws of physics apply to both.

C. If your plane has a tail wheel you may need to hold some up elevator as you begin to advance the throttle. The up elevator may be needed to keep the tail on the ground as the plane starts to roll. As you advance the throttle, decrease the amount of up elevator so that when the throttle is at full the elevator is in the neutral position. As the plane picks up speed the tail will begin to lift off the ground. Steering on the ground is accomplished with the rudder (left stick).

D. If you fly a plane with tricycle landing gear (nose wheel) just advance the throttle to full. Again remembering to steer with the rudder (left stick).

E. When the plane is rolling level apply a small amount of up elevator. When take off speed is reached the plane will rotate (lift into the air). Once airborne apply a little more up elevator to reach altitude. **TOO MUCH UP ELEVATOR WILL CAUSE THE PLANE TO STALL.** If the plane begins to stall you have to get the nose down **QUICKLY.** This is done by pushing forward on the elevator (right stick). Once the plane is level and has picked up speed you can begin a shallow climb again. If the engine begins to stall anytime during the take off, **ABORT THE TAKE OFF.** This is generally the sign of an engine running too lean. Take the plane back to the pit area and go back to **STEP 4 Adjusting the Carburetor.**

7. Flying.

A. .40 size two-cycle engine will run for approximately 12 - 13 minutes on 6 ounces of fuel. This gives you a flying time of about 8 minutes and 4 to 5 minutes to set up for a landing. You want to have enough fuel left in case you need to make several approaches. Remember you always want to land under power. It is better to shorten your flying time than to run out of fuel too far from the field.

B. Fly **HIGH.** Fly high enough to still see the plane clearly and yet have enough time to recover from a problem. The standard line is to fly at three mistake altitude. That is where you have time to recover from three mistakes before the plane hits the ground.

C. All beginner maneuvers should be **BIG.** **DO NOTHING TIGHT,** no tight turns, no tight loops, no tight rolls.

D. To turn the plane move the right stick (aileron/elevator) to the direction you want to turn and apply a little up elevator (pull back). It is the up elevator that is actually making the plane turn. If you make your turn too sharply, the plane may begin to spiral down. **DO NOT APPLY ANY UP ELEVATOR** as this will only make the spiral tighter. Correct by leveling the plane's wings using the ailerons. Once the wings are level, apply a slight amount of up elevator and begin to climb out.

E. Loops are performed by adding and holding up elevator to a plane in level flight. With the plane flying straight and level, apply and hold up elevator. The plane will begin to loop. Once the plane has completed the loop neutralize the elevator to return to level flight.

F. Rolls are performed using aileron input. With the plane flying straight and level and with plenty of altitude apply and hold full aileron. Once the plane has completed the roll, neutralize the aileron and return to level flight

G. One good exercise is to practicing flying straight and level down the center of the field. You don't have to fly low, just keep the plane straight as it flies down the center of the field.

H. Another good exercise is to make figure-8's in the air. A good figure-8 is one where your altitude remains constant thought out the maneuver. The figure-8 is simply a right-hand circle followed by a left-hand circle.

8. Landings.

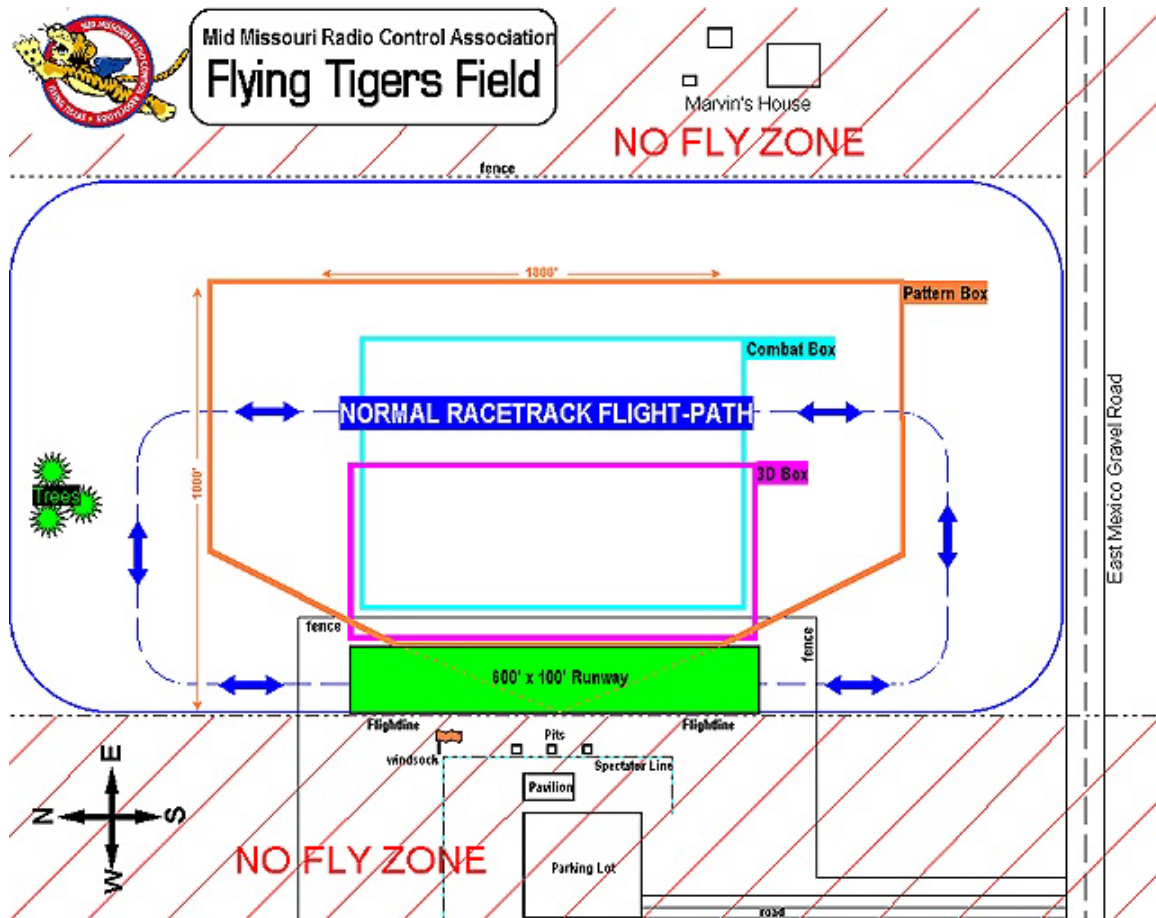


Figure 1. MMRCA flying field layout. Note the "Racetrack" Pattern in Blue

A. Landings, like takeoffs, are best done into the wind. You can break up landings into three sections. Think of your landing approach as flying a three-sided box. The first side of the box is the down wind leg. This is where you are flying parallel to the center line of the field and toward the down wind side. The second side of the box is the base leg. This is where you transition from flying with the wind to flying against the wind. This leg is 90 degrees to the center line of the field. The third side of the box is the final leg or approach. This is where you are flying into the wind down the center of the field.

B. Use the down wind leg of your approach to drop down to the correct altitude. Once at the correct altitude (20 to 30 feet) hold this altitude until you are about 100 yards past the end of the field. Then begin to turn onto the base leg of the landing.

C. Use the base leg to slow down. Cut back the power to idle and fly this leg until you are lined up a little short of the center line of the field. Once in this position make a shallow turn into the final approach leg. Your plane should now be **headed toward the field in a shallow dive.**

D. On the final approach, line up the plane with the center line of the field. Make small corrections, or you will stall until you are aligned with the center line of the field. If you are uncomfortable with the approach, simply apply power, then add a little up elevator, climb out and go around again. This is why we leave plenty of fuel for landing. You should now be in a shallow dive that will end up with the plane hitting the ground on the center line of the field about one fourth of the way from the down wind edge of the field. If the plane begins to sink too fast **DO NOT APPLY UP ELEVATOR OR, YOU WILL STALL.** Use the throttle to apply power to slow the rate of descent. Once the rate of descent is correct, allow the plane to almost settle onto the field. Just before the plane hits the ground (at 12 to 18 inches high), throttle back to idle and apply a very small amount of up elevator. This will cause the plane to stall or flair just above the ground, lose speed and touch down.

9. Cleanup.

A. Turn off transmitter and receiver.

B. Drain the remaining fuel from the tank. You should also run the engine until it stops from lack of fuel after the tank has been drained.

C. Clean engine oil off the plane. You can use the new formula 409 or a comparable product and paper towels, but use what works best for you.

Flight Guidelines

The Mid-Missouri Radio Association welcomes all responsible RC flyers who have current AMA Cards, paid annual dues, and agree to follow accepted guidelines. The following is presented to help make the RC experience safe, and by so doing, more fun for all. The guidelines are for safe operating practices and not just for the sake of regulation.

1. Flying Hours -- 10:00 AM to 9:00 PM
2. Have frequency pin before turning on transmitter, even if you are the only one flying. Someone else could come to the field while you are flying and use the same frequency. Special events like "fun flys" will have impound.
3. Pilots should fly from stations behind the protective fence on the west side of the runway. No flying to be done from the opposite side of the runway to avoid morning sun.
4. No flying over the pit or spectator area. No taxiing back into the pit area after flight.
5. No running engines on work tables.
6. Recommended: Start engines on pads at gates facing runway. If you need time and place to run in engines and are concerned about noise or distracting the pilot next to you, open spaces at the north and south ends of the protective fence are O.K. A work stand may be found in one of these areas. Good idea to be back at least 10 feet from line of fence.
7. Consider having a buddy hold our plane when starting the engine, especially the larger, more powerful ones. Also a spotter while flying can be helpful with telling where other aircraft are, helping with trims, etc.
8. When more than one plane is in the air at the same time, try to go with the general traffic pattern. You will still have much room for your own style of flying. Going with the flow lessens stress for everybody and reduces chances for close calls.
9. No alcohol allowed anywhere on the premises.
10. When training or helping a person new to RC, help him with good practices and see that his craft is airworthy.
11. Have a good time at the field, and if you are the last to leave, please lock the gate.

Preflight Checklist



These items should be examined before every flight to minimize aircraft damage.

Inside Fuselage

- 1. Battery voltage > 4.8v for five cell and securely connected.
- 2. Linkages are securely fastened.
- 3. Receiver and Battery are wrapped in foam and secured inside the fuselage.
- 4. Check of fuel leaks and tubing connections and wear.

Wing

- 1. Check for damage, holes, warping, and other defects.
- 2. Check aileron pushrods and clevises.
- 3. If using Rubber bands use fresh rubber bands for attachment.
- 4. Make sure you attach and align the wing correctly.

Engine

- 1. Check engine mount, bolts, propnut, and muffler nut are securely attached.
- 2. Inspect the propeller for damage and replace if needed.
- 3. Check nose steering gear.
- 4. Check engine adjustment.
- 5. Check Spinner and Propeller are securely attached.

Control Surfaces

- 1. Inspect all control surfaces and hinges for secure attachment and no damage.
- 2. Check clevis bands are on all clevises
- 3. Check Wheel Collars are securely attached

Balance

- 1. Insure the internal parts have not shifted and changed the balance.
- 2. Insure the plane is not tail heavy.

Radio Range Check

- 1. Be sure you have the correct frequency pin.
- 2. Perform an antenna down range check.
- 3. Check all control surface move in correct directions and with the proper throw.
- 4. Check the transmitter is on the correct model and with variable throws set correctly.

Training Checklist

Student Name:



Tasks	Comments
Radio & Engine Start	
Taxi	
Trimming	
Straight and Level Flight	
Left and Right Turns	
High and Low Throttle	
Figure 8	
Landing Approach	
Take-off	
Landings	
Simulated Dead Stick	
Solo	

Instructor:

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