Tuscarora

Radio Controlled Flying Club

Course Title: Introduction to R/C Flying

Category: Fixed Wing Flight

Tasks: Preparations for Flight

Purpose:

Radio controlled aircraft modeling is one of todays most exciting hobbies. It involves many interests, disciplines, and skills. Some of these are aerodynamics, electronics, mechanics, drafting and design, composite material construction, and woodworking, and these are in the airplane alone. To reduce the chance of frustration and before purchasing any equipment, the beginner should become involved with other modelers, visiting a flying site, become acquainted with experienced modelers or join a club. Any new modeler begins with an investment, care must be taken in equipment purchase whether new or quality used. The topics that will be covered will be relating to a beginner or novice and a trainer airplane. The information relating to all aspects of R/C powered flight can be overwhelming even to the most seasoned pilot. Those disciplines relating to the more advanced levels of R/C flight will most likely be learned as the skill level of the novice improves and the goals are more defined.

Tuscarora Radio Controlled Flying Club

Student Flight Instruction Manual

You are about to become part of one of the longest standing Radio Control flying clubs in Schuylkill County. We acknowledge our field is the only sanctioned field in the area and that alone brings in many flyers and spectators. The purpose of this instruction is not only for you to “solo” but to become proficent in flying to bring safety and enjoyment to other flyers as well as spectators and neighbors.

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Disclaimer:

First and foremost, the club, its members and spectators, are guests of the ***Pennsylvania Department of Conservation and Natural Resources*** i.e. the ***Tuscarora State Park*** and are subject to all rules and regulations established and set forth by the Bureau of Parks and Management.
Removal from the State Park for rules infraction is at the discretion of the Tuscarora State Park and/or the governing body of the Tuscarora R/C Club. Please be mindful of this as you represent the club in all activities either on or off the flying field.

Secondly, by becoming a dues paying member of the Tuscarora R/C Club, you agree to abide by the club guidelines as set forth by committee. You shall indemnify and save harmless the Tuscarora Radio Controlled Club, Tuscarora State Park and its jurisdiction, members, seller, vendors, affiliates, pilots, spectators, agents, employees, or volunteers from and against all loss or liability, whether based upon any event, act, activity, either by commission or omission or negligence of the Tuscarora Radio Controlled Flying Club or agents in connection with any activities that harbor the use of terms and conditions of the Tuscarora Radio Controlled Flying Club, items, members, sellers, vendors, affiliates, pilots, spectators, agents, employees, volunteers, or services from and or upon any deviation from said rules and regulations as forth by the Tuscarora Radio Controlled Flying Club whether or not caused by the Tuscarora Radio Controlled Flying Club or Tuscarora State Park and its jurisdiction, members, sellers, vendors, affiliates, pilots, spectators, agents, employees, or nomenclature volunteers.

Field Procedures & Safety Guidelines

It is the responsibility of all club members to abide by these simple guidelines. If you observe someone who isn't, please ask them to cooperate. They are designed to make our field the best and safest.

1. To utilize the airfield, all A.M.A. & Pennsylvania State Park-rules will be obeyed, and no person shall be in control of an aircraft without A.M.A. coverage whether he or she is a student or instructor.

2. Before starting engine or turning on your radio and if using the 2.4 system, your AMA card or a copy thereof must be in the pin box and no pin is required.

3. If using a 72MHz, a "pin" is required. you must take a channel pin number from the box AND replace it with your current AMA card. Without this pin you may not start your engine, turn your radio on, or fly! Return this pin after your flight. Never turn on your transmitter or test your equipment at your vehicle or in the parking lot. *REMEMBER - without your channel pin, you are financially responsible for the damage you create.

4. All flight gear and planes shall be placed in the pit area (25 ft. from fence).

5. Models will be started with engines facing the flight line at all times.

6. It is recommended when starting engines an assistant must hold model from the rear.

7. Needle valve adjustments are to be made with adjusters body positioned behind the prop.

******All new models should be inspected before the first flight by someone from the safety committee.***

8. Takeoffs must be executed in the most windward direction followed by a procedure to turn away from the flight line /pit area/and spectators

9. When flying the pilot must always stay on the flight line station and fly in front of the flight line - NEVER over the flight line, pit area or spectators. Also, if possible have a spotter stand with you in case of an emergency

10. Low passes fewer than 30 feet must be made at least 25 feet in front of the flight line

11. When any problems occur during a flight the pilot shall caution fellow pilots and spectators.

12. To retrieve a model on the field, give a warning to any pilot who is flying. i.e. “On the field”.

13. Flight pattern will be in force when more than one flyer is airborne. Flight pattern will be flown as described in rule 8 and dictated by wind direction

14. All models shall be starting in the pit area, taxied to flight line, flown, and stopped at the flight line and CARRIED to the pit area.

16. Since noise has been the reason for the loss of other fields, the testing and breaking in of engines will be prohibited at all times!

17. New members shall be trained by certified instructors. Current list is posted inside pin box. Members who wish to instruct new members please contact a safety committee person.

18. All new members who have not as yet soloed shall be required to fly the basic flight requirements prior to flying solo and it will be at this time When flying the pilot must always stay on the flight line station.

19. All engines .10 and over are required to have a muffler.

20. Remember: Flying without proper credentials, such as, approved solo, A.M.A. membership and coverage, will lead to a written reprimand and/or suspension of flying privileges either on a temporary or permanent basis.

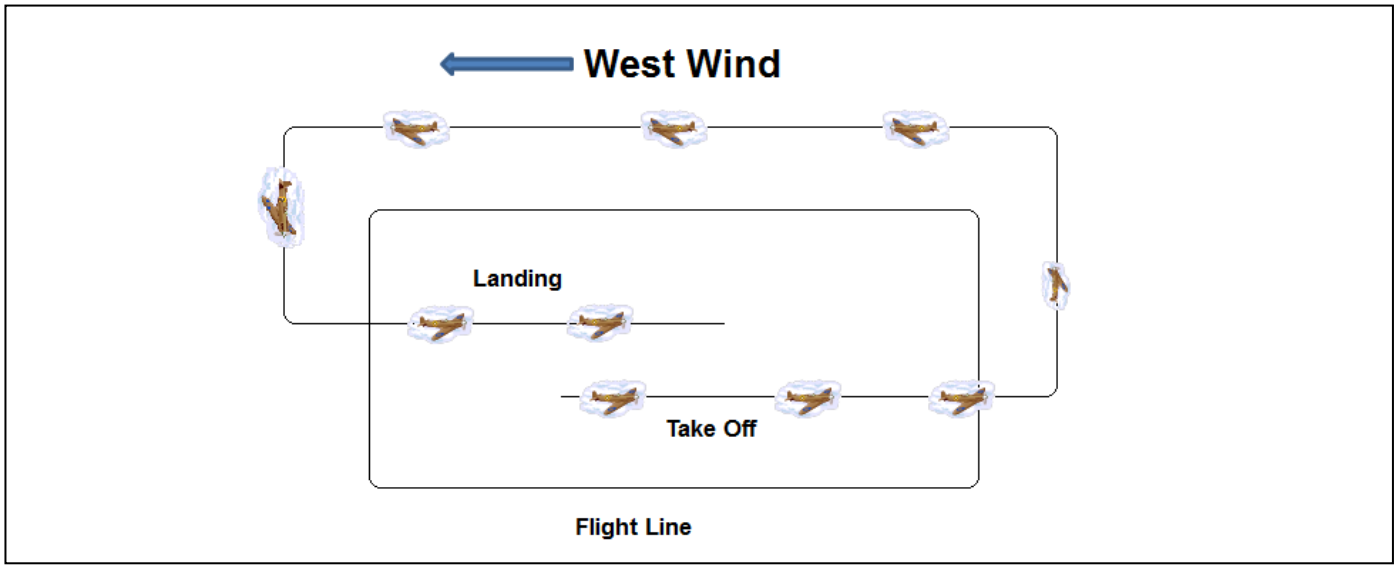
21. Any flyer that is **disabled** and a chair or devise is required, must have a qualified pilot/spotter with them at all times while they are flying. After completing a flight, the chair or device must be immediately removed from the flight line. REMEMBER members are responsible for the safe operation on this flying field.

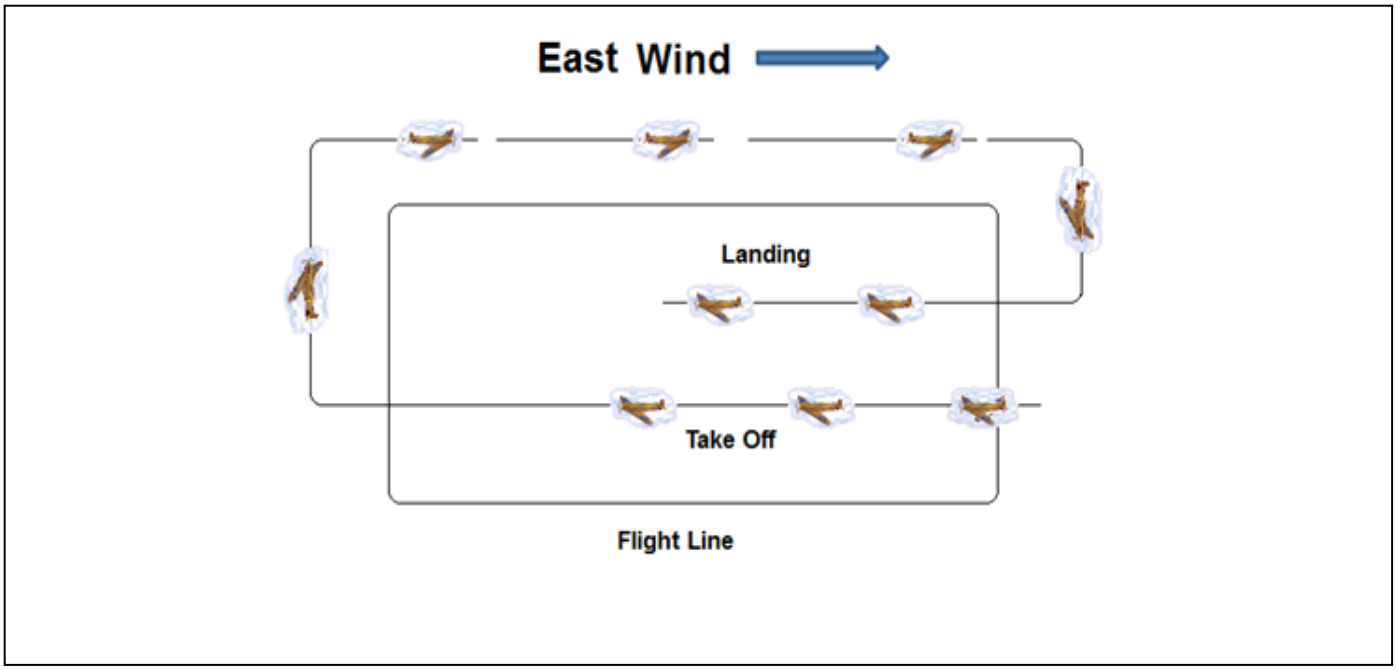
22. Stealing or destroying any property belonging to members, club, or state will result in immediate suspension and barred from the flying site; Prosecution may follow

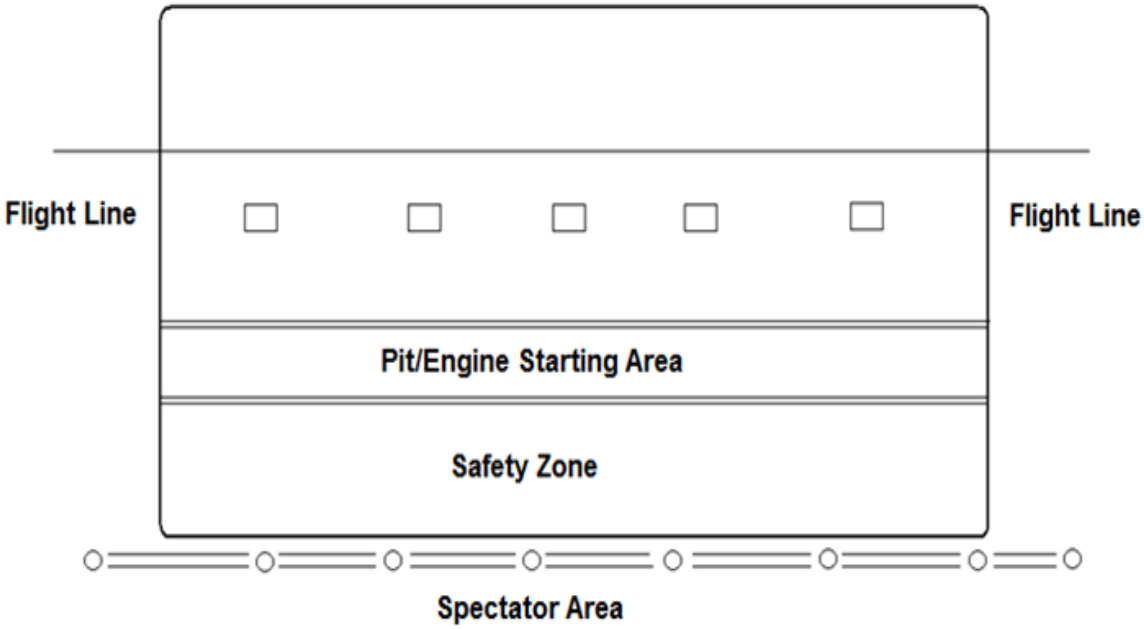
23. Anyone provoking a disturbance or fight will have flying privileges permanently revoked.

24. Any member receiving a grievance, who directs any retaliatory action against the person filing the grievance, will be subject to immediate expulsion from the club and flying site. This is to include threats, intimidation, physical harm, intentional equipment damage or any action deemed to be retaliatory by the board of directors.

Flight Patterns






Flight Line
Flight Line
Pit/Engine Starting Area
Safety Zone
Spectator Area

Additional rules that should be followed:

1. Never remove someone else's AMA card from the pin box without their permission.

2. When you turn on your transmitter, check to see if any airborne aircraft are affected. Be prepared to turn it off again!

3. Replace your pin and remove your AMA card when you are not using your system.

4. When refueling your air craft, use a catch container or some sort of material to prevent fuel from contaminating the soil.

5. Never start a loose aircraft; get assistance or use the anchors located at the field. Never start at full throttle; partial is usually sufficient.

6. Do not turn your back to the flight area, especially if you are at a pilot station.

7. Do not taxi your aircraft in the pit area except to prepare for flight.

8. Fly only from pilot stations; until you are approved for solo. Always have a proficient spotter accompany you.

9. Before approaching the flight line, do a "systems" check.

10. All flying will be south of the flight line, which is the northern edge of the runway. Never take off directly from the pilot station line.

11. Announce your intentions loud & clear: "going up", "coming in", "on the field", "dead stick", component or radio failure etc.

12. Do not fly over the parking lot, highway or homes.

13. Personnel who are not piloting an aircraft should refrain from disturbing or distracting those who are.

14. No spectators or pets beyond the rail fence.

15. Talk to the spectators and answer their questions. They are the future growth of the sport and our club. Everyone is a potential new member. Politely request that they remain on the spectator side of the fence.

16. Above all else, conduct yourself in a professional and mature manner. Make club officers aware of those who don't and are detrimental to our image

17. Please clean up your trash i.e. water bottles, cigarette butts and coffee cups.

Safe Flying Tips and Hints

1. Roll test steering in a driveway or basement. If it doesn't roll straight at home, it won't roll straight on a runway. Set control to the low-rate.

2. Put Monokote (or otherwise) small marks at the C.G. (Center of gravity) on the wing to indicate balance location. Makes it easy to check at field.

3. Balancing laterally (side to side) will help aircraft track better in maneuvers. Hold at spinner and tail. Add wing tip weight as necessary.

4. Check receiver battery every 2-3 flights. Make a chart of how long you have flown vs. Voltage drop.

5. Always turn on transmitter 1st, receiver 2nd. Always turn off receiver 1st, transmitter 2nd.

6. Range check your system before 1st flight every time out. This should be performed with engine running at both idle and full throttle.

7. When using the buddy box system, make sure both boxes are set identical. Never turn buddy box power "on"!

8. Remove transmitter neck straps when starting engines.

9. If you don't have a starter, at lease use a "chicken stick". Do not hit it against the propeller; to start your engine, flip prop with the stick next to it. (Touching)

10. Never jamb a running starter onto the spinner. Back up the propeller and place the starter cone against spinner before turning on.

11. When you start your engine, look at your watch and keep track of time. After flight, check fuel level to judge maximum available flight time.

12. Do not reach over propeller to adjust needle valve. Do it from the rear. Do not position yourself (or others) to the side of a rotating blade. It could fail on run-up or kick up debris.

13. Taxi while holding “up elevator”.

14. Fly with a co-pilot/spotter

15. Never practice maneuvers at low altitude. Always practice “3 mistakes high”

16. When trimming an aircraft in flight, trim only until it stops the incorrect movement. Trying to correct entirely will only put it out of trim to the opposite direction.

17. Most trainer aircraft will recover from unusual attitudes (mistakes) by killing the power, wait and pulling up elevator (depending on altitude). Be ready to level out and apply power.

18. Remember, unless you are “dead stick”, you do not have to land. If it’s not right, go around. It’s much easier, and safer, to do it over rather than try to salvage a bad approach.

19. Do not fly too far away as it is easy to get disorientated. This is especially true when the sun is low on the horizon and the aircraft becomes a silhouette.

20. If you are using dual rates, return to high rate before entering the landing pattern. Do a couple of turns to adapt to the greater sensitivity again.

21. On flat bottom wing trainer planes: Low speed handling (banking characteristics can be improved by raising each aileron 1/8” or so. It makes the “up” aileron more effective.

Helpful Hints:

a. Installing larger (2 ¾”, 3”) wheels will make taxiing in grass easier.
b. Improve your visual orientation in the air
c. Improve your landings as gear won’t bend as easily

Ground School

This section is designed for those that have little or no knowledge of aerodynamics, and/or are totally new to the hobby. Please read it thoroughly.

First, if you are just starting out, selecting a plane is a difficult task. A decision must be made if you are going to buy used, ARF (Almost Ready to Fly) or a kit. Generally speaking, by the time you buy a kit, appropriate tools, the hardware and the covering, you have spent as much as the ARF and it will take it twice as long to put the kit together.

Major differences are if you do destroy an ARF, you won't have the time or investment loss. However, the advantage of a kit is you know the mechanics of how it is built and how well it is constructed.

Second, if you are just starting out don't over-spend; just get the basics. Get to the field and work with an instructor or fellow pilots, then decide if you need an upgrade. All too often, new hobbyists overspend, don't learn as quickly as they had hoped, and get discouraged. This is especially true if they tear up their first airplane.

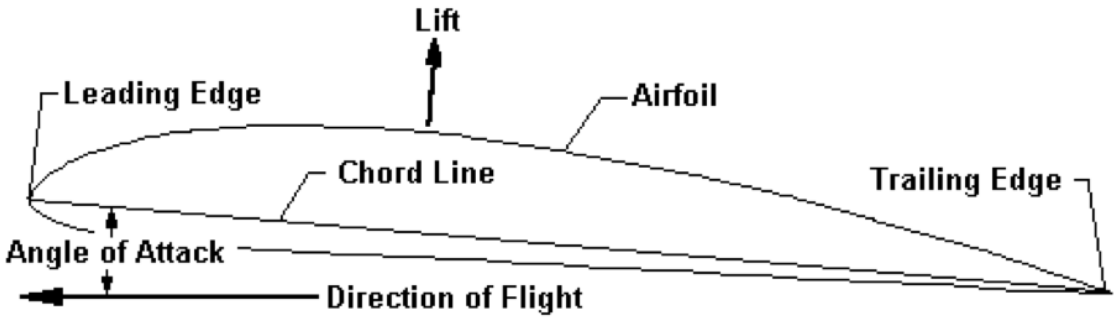
Third, get some flight time in after you've soloed, and you'll have a better idea on your direction and path to take.

The intention of this learning guide is to provide general understanding of basic aerodynamics will help to understand why it does what it does.

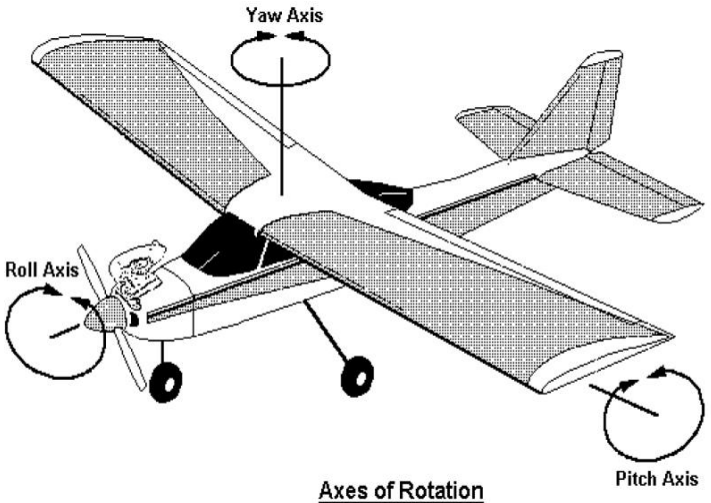
Note: *Referring to aircraft as to right or left, is as a pilot would view it from the cockpit.*

The Basics of Flight

The concepts of flight should be understood by a beginner. The therories behind the physics of flight are covered in many volumes of books. There are different and sometimes conflicting theories and arguments as how airplanes fly, but the one accepted principle is that lift is generated as a result of the airpressure on the bottom of the wing being higher than the air pressure on the top of the wing.



Lift increases as the velocity of the air passing over the wing increases or as the angle of attack increases as long as the flow of air over the wing remains smooth. Actual flight is attained when the force of the lift equals weight.
An aircraft pivots about three (3) axes; the yaw or vertical axis controlled by the rudder, the pitch or lateral axis controlled by the elevator, and the roll of longitudinal axis controlled by the ailerons. It can pivot about any one of these individually or in combination based on the control surfaces that are moved and the direction of the movement.



Axes of Rotation

The Basics of Flight…The Plane

One significant component(s) of any plane are the wings. Their design and location determine flight characteristics, and each has specific flight attitudes.

Wing: The horizontalsurfaces which provide the lifting force

There are three basic wing profiles.

Flat Bottom: Creates the most lift and is the most stable. Most trainers are flat bottom. This wing cross section should have a virtually flat bottom. This type of cross section has more gentle flight characteristics that are necessary for a beginner

Semi-Symmetrical:
Still stable, yet allows more maneuverability and extends aerobatic capability. Great for “second” planes.

Fully Symmetrical:
Least stable and most aerobatic. For more experienced flyers only. There are three basic wing locations.

Wing position/location:

1. High-Wing. A high wing model is inherently more stable than a low wing model due to pendulum effect. Since the weight of the model is below the wing, the fuselage tends to swing downward like a pendulum in order to equalize forces.

2. Mid-Wing,/ Low-Wing. The weight of the model divided by the area of the wing should not exceed 19 oz. /sq. This reduces the speed required to maintain an acceptable rate that the model descends when the power is reduced resulting in a lower landing speed.
   Stability diminishes as the wing comes down; the high wing being the most stable. Here too, most trainers are high wing. A fully symmetrical, mid-wing with no dihedral is the most aerobatic.

The Basic Trainer

A beginning pilot must realize the dedication that is required to gain the ability to fly the type of model that perhaps initially spawned his interest. He or she must begin the hobby with a basic trainer and progress through different levels of models until your goal is reached in order to be successful. Too often new pilots get discouraged from the onset by not making prudent choices with the introductory plane. These are called a trainer. The plane is called a trainer because of that reason, it trains.

There are certain criteria that a trainer should have in order to be satisfactory for a beginner.

1. **High-Wing**- A high wing model is inherently more stable than a low wing model due to pendulum effect. Since the weight of the model is below the wing, the fuselage tends to swing downward like a pendulum in order to equalize forces.

2. **Flat Bottom-** Creates the most lift and is the most stable. Most trainers are flat bottom. This wing cross section should have a virtually flat bottom. This type of cross section has more gentle flight characteristics that are necessary for a beginner

3. **Dihedral –** The wing should have some dihedral. This means that the tips of the wings are higher than the center. The effect of the dihedral is to try to equalize forces and keep the wings level or to return the wings to a level orientation.

4. **High Aspect Ratio –** The ratio of the wing length or span should be at least 5 ½ times the width or chord. This will reduce the rate at which the model responds to command input allowing more time for a beginner to react.

...continued

5. **Constant Chord –** The width of the wing should be the same from the center or root to the end or tip. This distributes the weight of the airplane evenly over the entire surface of the wing.

6. **Moderate Size -** Most trainers are for engine sizes between .15 and .60. The smaller ones are more susceptible to the effects of wind and normally the wing loading is higher simply because of the weight of the radio equipment. The larger sizes are easier to fly and easier to see but are more difficult to transport. Most trainers are for .40 size engines. These trainers have been widely accepted as the optimum size.

7. **Structurally Sound –** A trainer must be able to take the abuses imposed by a beginner. This is especially true for hard landings. It must be able to withstand minor crashes with minimal damage. It should be relatively easy to repair.

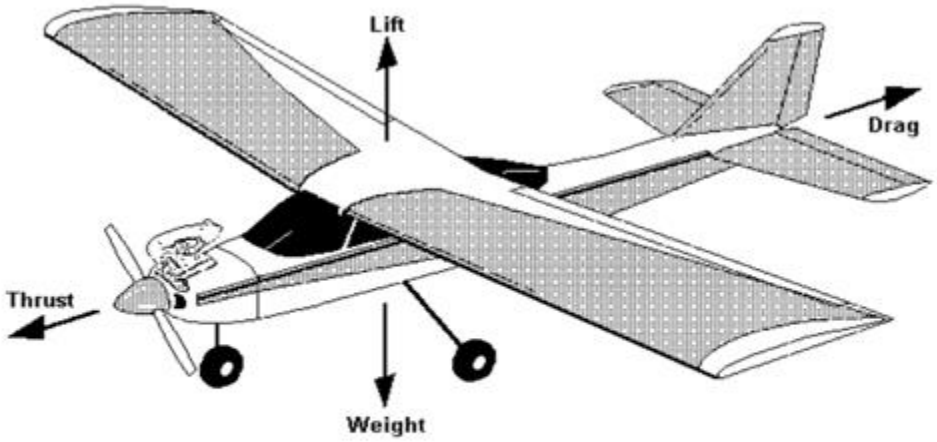
Note: *A trainer is a specific type of model aircraft that is designed to be stable in flight. This means that it has an inherent ability to correct itself and overcome the rotational forces applied so that it regains straight and level flight. Most trainers are designed to that they remain stable in slow flight so that they are easy to land.*

How These Things Fly

The Basic Trainer

A trainer that meets these guidelines will give the beginner excellent service. There are a lot of considerations when choosing a trainer but the two most basic are time and money.

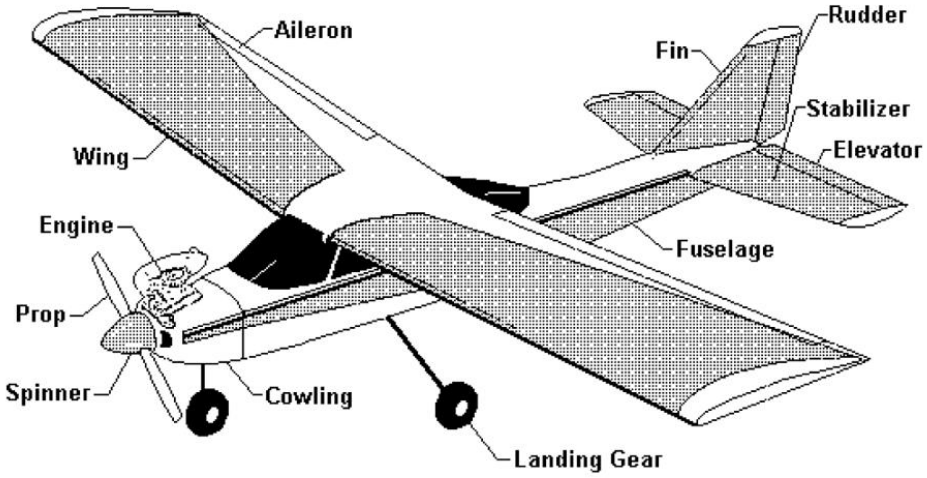
Almost Ready to Fly (ARF) models usually come complete with engine and radio. A trainer built from a kit has the advantage of being less expensive in some cases and it gives the builder the pleasure of building, the option of color and trim scheme, and the knowledge of the structure to perform repairs. The biggest disadvantage is the time required to construct the model when the beginner would rather be learning to fly.



Flight Forces

When the rudder is moved to the right, the aircraft will rotate to the right about the yaw axis and vice versa. When the elevator is moved up, the aircraft will pitch the nose upwards. The ailerons move in opposite directions. When the left aileron is moved up and right one down, the aircraft will rotate to the left and vice versa.

Air Craft Nomenclature



Aileron – The moveable portion of the wing which causes a change about the roll axis.

Cowling – The part of the fuselage which covers the engine.

Engine – A two cycle reciprocating machine which provides the motivational power.

Elevator – The moveable portion of the horizontal stabilizer which causes a change about the pitch axis.

Fin – Properly know as vertical stabilizer which provides stabilization about the yaw axis.

Fuselage – The main body of an aircraft

Landing Gear – The supporting structure of an aircraft including landing gear struts and wheels.

Propeller (Prop) – The combination of blades which provide thrust

Rudder – The moveable portion of the vertical stablizer which casues change about the yaw axis.

Spinner – Covering over the prop hub used in starting

Stabilizer – Properly known as horizontal stabilizer which provides stabilization about the pitch axis.

Radio Systems

First, a few words about older "narrowband" RC systems...

Traditional narrow-band RC systems on anywhere from 27MHz to 72MHz are fairly easy to understand because they work like your regular AM or FM radio - sending out a signal that is picked up by the receiver and then sent to the servos.

Unfortunately, just like regular FM broadcast radio, these RC systems require a frequency all to themselves if they're going to avoid interference with each other. What's more, it doesn't take much to disrupt a regular narrow-band signal. Manufacturers of spread spectrum (SS) radio systems are claiming that you need never worry about being shot down by other fliers and that all 2.4GHz systems can get along in harmony, despite apparently using the same frequencies.

How do traditional RC systems work?

NARROWBAND FM/PCM RADIO CONTROL

Ever since the first radio control systems for models were built over half a century ago, the technology has been "narrowband". Narrowband refers to the amount of space that signal takes on the spectrum of available frequencies.

Today's FM/PCM radio control systems operate on a tiny sliver of space on relatively low frequencies (27, 35, 36, 40, 41 or 72Mhz). This tiny allocation of bandwidth for each RC channel creates a number can be likened to riding a bicycle down a narrow trail and the same problems apply:

First, you can't ride very quickly simply because it's such a squeeze to get past the bushes and fences either side of your trail. In radio terms this means you can't send the control information between transmitter and receiver very quickly. Newer Transmitters use spread spectrum technology in the 2.4 GHz, upper-UHF frequency band for communication. Spread spectrum technology allows many pilots to transmit in the same band (2.4 GHz) in proximity to each other with little fear of conflicts. Receivers in this band are virtually immune to most sources of electrical interference. Amateur radio licensees in the United States also have general use of an overlapping band in this same area, which exists from 2.39 to 2.45 GHz, with newer aftermarket transmitter RF module/receiver combinations on the 70 cm band also offering user-programmable, spread-spectrum versatility of varying degrees for Ham RC modelers in both the USA and Canada, only as secondary users without "exclusive" use provisions.

Second, if you run into another cyclist on that narrow track, chances are that you'll both fall off and get hurt. In radio terms it means that almost any other signal on the narrowband frequency you're using will result in interference (glitches or lock-out).

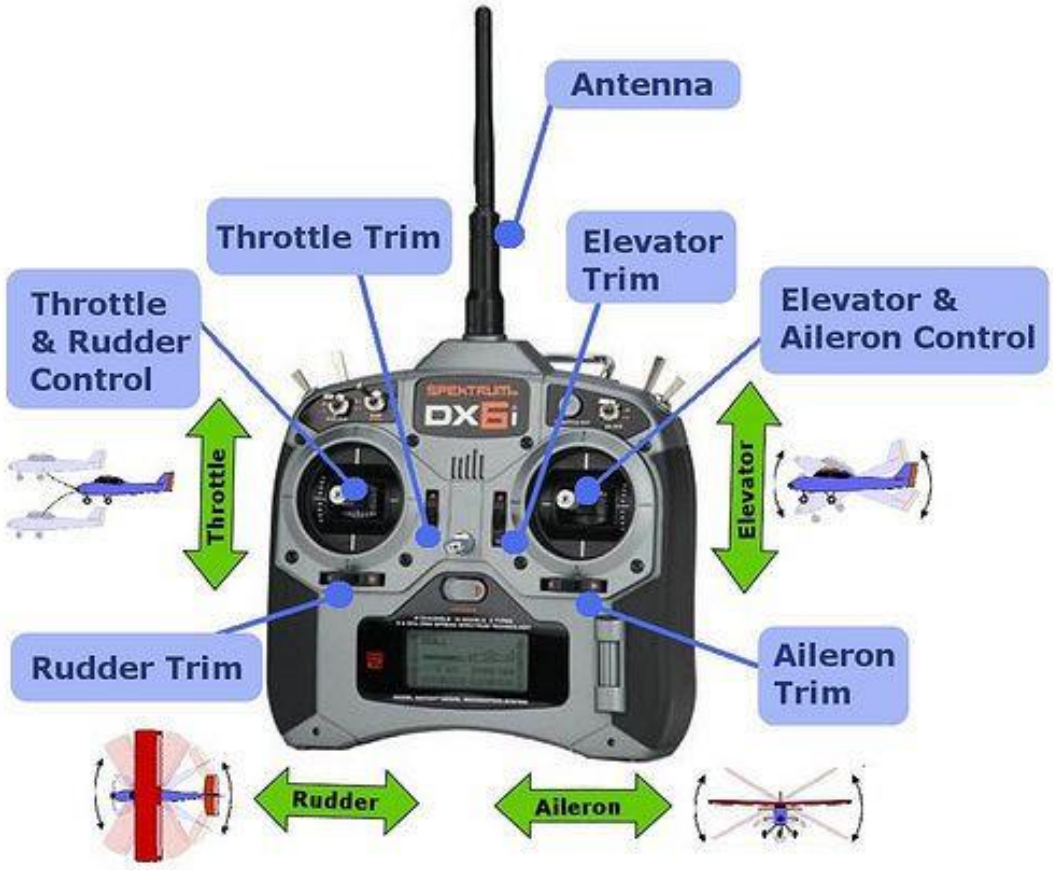
Clearly this isn't the best situation for controlling a potentially expensive and sometimes dangerous radio-controlled model but, with careful channel management, it has served us well for decades.

Radio Systems

Regardless of the brand of system, the number of channels, or the price, all transmitters have the same basic components. Transmitters may have additional switches, slides, and displays depending on the functions they perform but the basic components remain the same.

There have been discussions over the years involving the number of channels with which a beginner should start. Some people say that only three (3) channels should be used; rudder, elevator, and throttle. The argument here is that it is easier for a beginner to only be concerned with using the rudder to make turns and not be concerned with the ailerons. Others contend that four (4) channels should be used for the beginner; rudder, ailerons, elevator, and throttle. The contention in this argument is that by not using ailerons, a beginner must go through a second phase of beginner training that being learning how to use ailerons. A four (4) channel system offers better control of the model during takeoffs and landings in cross wind conditions. If a beginner chooses to use only three channels, he can set up the trainer so that the ailerons are not used initially and then add them later. The four (4) channel approach to training is more widely accepted.

Also, beginner might consider buying a six (6) channel systems to get some of the features that are not available in the basic system such as dual rate controls. This feature allows the user to reduce the sensitivity of the sticks thereby reducing the chance of over controlling. If the beginner is relatively sure of future goals that involve the use of a six (6) channel system, he can consider this an investment in his future modeling and therefore save money. A lot must be determined before the initial purchase and should be discussed at length with experienced modelers, especially the intended instructor, before the purchase is made.



This is a typical lay-out of the transmitter and its functions.

The Basic Power Plant

There are two types of engines/motor’s that are used today; glow and electric.

Electric

- Electric motors are adequate for most beginning- to intermediate-level airplane models. They require an onboard battery pack that has to be recharged after each flight. An electric motor can be started remotely and does not require a separate starter. This is considerably safer for fliers, whose fingers don't have to get near a spinning propeller during start-up.

Glow

- A glow engine uses what is called a glow plug to ignite fuel inside the combustion chamber. Glow engines come in two-stroke or more powerful four-stroke varieties. A glow engine requires a battery-operated glow starter to heat the plug, in addition to a propeller starter or hand starting.

Electric Pros: Can be made infinitely faster, easier to maintain, quiet, lower operating costs.

Electric Cons: Expensive startup costs, down time between charges, unless you have multiple batteries.

Nitro Pros: Faster out of the box. Lower initial cost

Nitro Cons: Higher operating costs (nitro is $25.00 per gallon and is not renewable. Batteries can be used over and over).

Comparison

- Both types of engines have their supporters. A glow engine provides a lot of power in a small package, plus a realistic engine sound that some modelers like. An electric motor is usually less powerful, but it is quiet and can be started with the push of a button. Glow engines require constant refueling. They also often have a cylinder or carburetor that sticks out of the airplane's fuselage to the possible detriment of the model's aerodynamics and appearance. Fans of electric motors enjoy the devices' low maintenance, as opposed to the difficulty of tuning a glow engine. Either type of engine is usually suitable for aerobatics.

Costs

- The glow engine requires a specialized fuel, which can get expensive. Electric motors just need a recharge from any standard power source. The flight time of a glow-powered plane depends on the size of the fuel tank, whereas an electric plane can stay aloft for nearly an hour depending on battery type and size.

SOLO FLIGHT

1. Three take offs and landings with adequate control with no damage (other than broken prop or nose gear.)
2. Power on and off stall with recovery.
3. Controlled pattern at low or idle speed.
4. The ability to control an airplane during an emergency. Such as engine failure

****The certification will be done by two instructors and 1 soloed pilot. ****

Procedures:

Student Pilot Task Goals

Task #1: Ground support equipment, engine starting, & taxi training

- Perform aircraft preparation and inspection.
- Perform engine start and radio checks.
- Perform taxi course.

Task #2: Orientation Flight

- Observe orientation flight.
- Note ground and flight safety restrictions.

Task #3: Basic flight skills development

- Become familiar with speed, yaw, pitch, and roll commands.
- Become familiar with flight trim techniques.
- Execute straight and level flight.
- Execute left and right turns.
- Initiate stall or unusual attitude recovery.

Task # 4: Takeoff

- Execute proper upwind takeoff runway alignment.
- Initiate takeoff throttle setting.
- Maintain runway centerline ground steering during takeoff acceleration.
- Execute takeoff rotation at proper speed.
- Execute proper climb speed, pitch, and bank angle.
- Perform a takeoff abort if required.

Task #5: Turns

- Perform level shallow turns (left & right) at approximately a 20° bank angle.
- Perform level medium turns (left & right) at approximately a 40° bank angle.
- Perform level steep turns (left & right) at approximately a 60° bank angle.
- Execute shallow, medium, and steep turns (left & right), level flight, at low, medium, and full speeds.
- Execute turns in a designated area.

Task #6: Planning maneuvers

- Perform level rectangular patterns (left & right) as well as figure eights over specific ground location(s).
- Apply crosswind technique to maintain proper ground tracking during planning maneuvers.

Task #7: Landing pattern and go-around

- Execute upwind landing patterns.
- Execute crosswind landing patterns.
- Execute downwind landing patterns.
- Perform go-arounds at a 2 – meter height on final approach.

Task #8: Touch-and-go landing

- Perform traffic pattern(s), final approach, and touchdown, followed by power application and pattern reentry.
- Perform normal and crosswind traffic patterns with touch-and-go maneuvers.

Task #9: Full stop landing and supervised solo control

- Execute full stop landing followed by taxi back and takeoff.
- Execute simulated engine out landings.
- Perform a supervised solo flight.

Task #10: Supervised Solo Proficiency/Mid-phase Review (Solo Flight)

- Practice Task 1 – 9 maneuvers.
- Place additional emphasis on instructor-recommended areas of needed improvement.

Task #11: Mid-phase Evaluation Task (Solo Flight)

- Perform the sequence of maneuvers required during the mid-phase evaluation.
- Review mid-phase I flight evaluation results and discuss strengths and weaknesses with instructors.

Task #12: Airspeed Control Maneuvers (Solo Flight)

- Perform full, medium, and slow speed rectangular patterns (left and right) as well as figure eights from level flight.
- Execute a constant speed climbing rectangular pattern as well as figure eights.
- Execute a constant glide rectangular pattern as well as figure eights.
- Perform all maneuvers over designated ground locations.

Task #13: Power-On Spot Landing (Solo Flight)

- Perform near stalled touchdowns on the runway with power on.
- Execute near stalled touchdowns within 2 meters of the runway centerline.
- Perform touchdowns initially within a 30-meter long touchdown zone, within 2 meters of runway centerline, graduating to a 15-meter long touchdown zone.
- Execute a go-around whenever overshoot landing conditions exist

Task #14: Power-Off (Idle) Spot Landings (Solo Control)

- Perform a near stalled touchdown on the runway with power off (idle).
- Adjust landing pattern to touch down within 2 meters of runway centerline with power off (idle).
- Adjust landing pattern to touch down within 2 meters of runway centerline and within a 30-meter long touchdown zone.

I have read and comprehend the rules, guidelines and information contained in this packet

_____ _____

NAME ***DATE***