YORK COUNTY FLYERS

NEW PILOT TRAINING MANUAL

Student Pilot Name

YCF Instructor's Name and Contact Number

Version 3.4 – September 2021

Introduction:

This pilot training program is designed for an individual who has not previously been trained to fly remote controlled aircraft with a sanctioned Academy of Model Aeronautics (AMA) club. For this reason, an uncertified pilot is not allowed to fly without the assistance of an instructor.

The intention of this program is to teach someone new to the radio control (RC) hobby how to successfully fly their aircraft in a safe and fun manner. The amount of time it will take to learn to fly varies significantly with individuals. Some people may become proficient enough to solo in a few sessions at the field, while others may take longer. With patience and perseverance, we believe anyone can become an R/C pilot.

To qualify for this program the student pilot should be registered with the FAA, must be a member of AMA or registered in the AMA Introductory Pilot Program and is strongly encouraged to become a member of York County Flyers prior to beginning flight training. This program works best when the student pilot has his/her own airplane, radio system, and related flight equipment.

Each step in the program must be completed successfully before beginning the next step. The instructor is responsible for determining if the student understands the information and can perform the various maneuvers required. The program is based on four keystones:

SAFETY – Properly built, and flown RC aircraft present no great risk to anyone. However, in the hands of an inexperience pilot, an airplane or other aircraft can cause considerable damage to property and/or personal injury. Safety will always be the primary consideration in the training program.

SUCCESS – Learning to fly RC aircraft is a fun challenge, but one that can be met by everyone. Without an instructor, the beginner is virtually guaranteed of several crashes. It is the intention of the YCF training program to get a student through the training without crashing. Of course, there are no guarantees since RC flying is inherently risky.

PROGRESS – This program is a set of orderly steps ending in solo flight.

FUN – The whole point of this hobby is to have fun. Each time you master a new skill, you should feel a great sense of accomplishment and joy.

Disclaimers:

Please keep in mind that *the YCF instructors are ultimately not responsible for your aircraft*. The individuals that volunteer their time for the purpose of teaching you to fly are competent pilots. They will, to the best of their abilities, check out your aircraft, radio etc., and instruct you in the safe operation of your aircraft. A "Buddy Box" (2 connected radios) will usually be used during your training sessions. If you don't have access to a buddy box YCF will try to provide one for use during training. This is the safest way to learn to fly R/C aircraft. If for some reason there is a mishap, the repairs and associated costs are *your responsibility*. Your instructor and other YCF members will be happy to provide you with advice on how best to complete any required repairs.

FAA requires all unmanned aircraft to use "See and Avoid" techniques for collision avoidance with manned aircraft. It is the responsibility of all unmanned aircraft pilots to avoid manned aircraft at all costs.

Prior to beginning instruction:

Prior to training, the student pilot should register his/her aircraft with the FAA, be an active member of AMA (unless registered in the AMA Introductory Pilot Program), and is strongly encouraged to be an active member of YCF. They must also read the safety code on the AMA website and the field rules for the York County Flyers.

1. To register with the FAA to fly small unmanned aircraft systems (sUAS), visit the following website:
   https://faadronezone.faa.gov
   Select "I fly under The Exception for Recreational Flyers" and follow the prompts.

2. Register with the AMA by visiting the following website:
   https://www.modelaircraft.org/membership/enroll
   Select the correct type of membership and follow the prompts.

3. Pass the "The Recreational UAS Safety Test" (TRUST) by visiting the following website:
   https://trust.modelaircraft.org/
   This is a "No Fail" type of a test for educational purposes. Print or digitally save your completion certificate when complete. All recreational flyers must pass an aeronautical knowledge and safety test and provide proof of test passage (the TRUST completion certificate) to the FAA or law enforcement upon request.

4. Visit the YCF website to join our club:
   http://www.yorkcountyflyers.com

Note: Even as a student pilot, if you notice another pilot breaking the AMA or YCF Safety and Field Rules, you can ask them to abide by the rules. Safety should be everyone's concern.

Now that the legal stuff is out of the way, let's get to the fun stuff.

Aircraft Preparation:

Use the information that came with your aircraft to be sure it is properly set up before coming to the field (don't hesitate to ask for help). Be sure all control surfaces operate properly and the surface throws are set as recommended by the manufacturer. Make sure your Center of Gravity (CG) is within the bounds defined by the manufacturer. Acquire all the necessary field items to fly your airplane, such as batteries, battery charger, fuel, igniter, tools, etc.

The more time you spend getting familiar with your aircraft and the items you will need at the field, the more likely you are to have fun and be successful in your training sessions.
This instruction program will start with an inspection of your aircraft at the club field to ensure that it is ready to fly. Any adjustments or modifications the instructor feels necessary to fly safely, must be completed prior to commencing training.

If you aren't confident performing the setup and adjustments/modifications on your own, your instructor or mentor (many of the other club's experienced pilots) can assist you. Time spent together *before* going to the field can be very valuable.

Your instructor will re-inspect the plane, with you, before the first flight.

The Buddy Box System:

Though not required, the "buddy box" system helps to reduce the risk to your aircraft and provides an enjoyable learning experience. Two transmitters are used; one for the student and one for the instructor. Spektrum transmitters allow for wireless "buddy box" - your instructor will try to "buddy box" transmitters if you have a Spektrum transmitter.

The instructor controls the aircraft to a safe altitude using the primary transmitter. He depresses a switch on his transmitter, transferring control of the aircraft to the student, who then flies the plane. If the student gets the plane in an unsafe situation, the instructor releases the switch and resumes control of the aircraft to fly it back into a safe situation. The instructor will perform takeoff and landing procedures of the aircraft until he feels the student is able to do so safely.

Instruction Time:

Weather permitting, instructors may be found at the field at different times; however they will give priority to instructing students that have made an appointment with the instructor. If a student just shows up at the field and hopes to get instruction he/she may not be able to find an instructor. An instructor is not guaranteed to be at the field or may not have time to instruct on that particular day. For these reasons, it is best to contact an instructor from the instructors list prior to showing up at the field. Of course a visit just to ask questions of any member or observe is always welcome!

You may consider working with more than one instructor to get different perspectives. For continuity, all instructors are encouraged to follow this New Pilot curriculum. As a student, select instructors you feel most comfortable with so they may assist you in progressing quickly toward your goals.

To make your time as a Student RC pilot more enjoyable and productive:

Inspect your aircraft at home to the best of your ability.

Get your model aircraft inspected and corrected if needed before every flight session at the field.

Consider getting flight simulator software for your PC, if you have one. ***Any time spent on an RC flight simulator will greatly reduce your training time at the field and shorten your learning*.**

Read the instruction manual for your transmitter and watch YouTube videos. Instructors can't be expected to know how all the transmitters from different manufacturers function. Especially understand how to enable the "trainer" function on your transmitter.

Gas/Glow Engines: Read the instruction manual for your engine. Perform the break-in EXACTLY as instructed. Any break-in opinion expressed by a club member is exactly that: an opinion. It may be a good one, but it may not. If breaking-in the engine at the field, be considerate and do so where the noise will not intrude other club members, well away from the pit area.

Electric Motors: Read the instruction manual for your Electronic Speed Control (ESC) and know how to set its parameters. Read the instructions for your battery charger and know how to charge your batteries.

Aircraft set-up can be daunting at first. Ask for help if needed and consider meeting with an instructor or mentor *before* heading out to the field.

Bring to the field, the instruction manuals for your radio, aircraft, engine, ESC, Charger and any other equipment as applicable.

Review all pertinent instructions so you know what to expect.

If you make **ANY changes** to your aircraft between instruction sessions, inform your instructor.

The Instructors volunteer their time. Remember that they like to fly their own aircraft too. Through the instruction process and beyond, the more you put into the club, the more you will get out of it.

Have patience, RC aviation is enjoyable and you will enjoy both the learning process and club membership by following the guidelines above and not rushing the process. Crashes do occur, so don't get frustrated – even experienced pilots make mistakes (of course we learn to blame them on our equipment), it's a part of the hobby.

SAFETY FIRST:

- **ALL** pilots must be thoroughly familiar with the AMA Safety Code as well as the YCF Safety Rules and practice these rules at all times when flying. These can be viewed and downloaded at https://www.modelaircraft.org/ and https://yorkcountyflyers.com/bylaws-safetyrules
- Be familiar and obey the No-Fly Zones at the YCF field
- Be familiar with the location of the first aid kit and fire extinguishers
- No taxiing in the pit area or flying over the pit area
- Announce to all flyers when you are taking off and landing, going on the field to recover your airplane, clear of the field, or if you have an emergency
- Know the location of emergency contact numbers

Approved Flying Area:

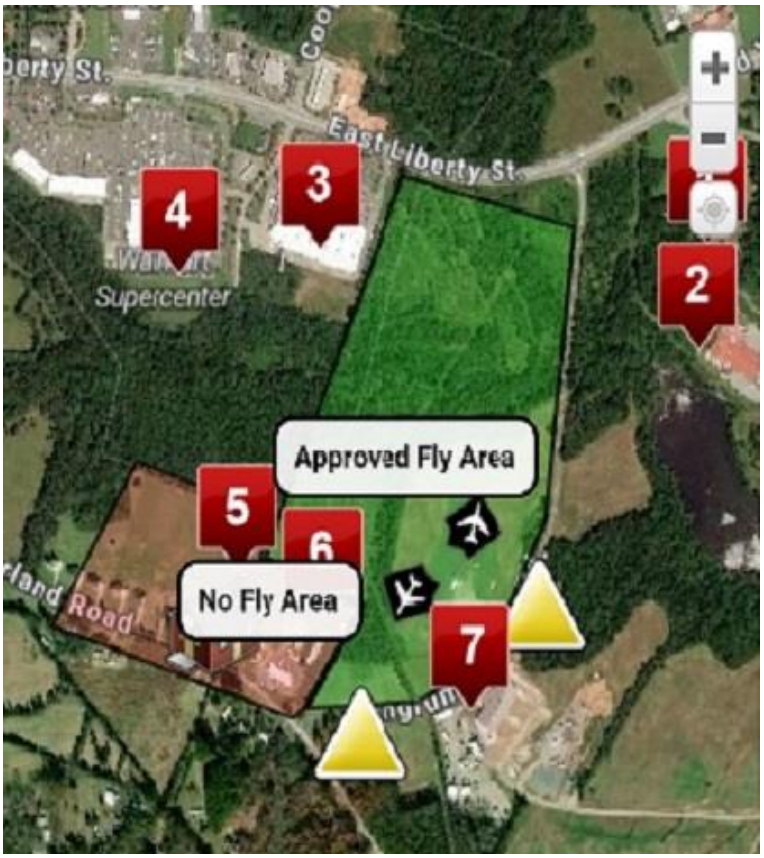
YCF has an agreement with York County to use this property. So as not to put this privilege in jeopardy, it is extremely important for all members to obey the No-Fly Zones as designated.

AIRCRAFT MUST STAY OVER THE FLYING FIELD

⚠ Langrum Branch Church is located south of the field, and maintains a cemetery just outside the entrance to the field to the east. The club observes a self-imposed restriction on Sunday until noon with electric only flight operations. Out of respect for the church members we also cease all flight operations during any service observed at the Cemetery.

NO-FLY ZONES

1 2 The tower located to the North and North East is the York County Office of Emergency Management. This is a 480' communications tower which handles many critical county communication functions to include 911 service, and just South and East is the Prison and Justice Center. Flying anywhere near these is strictly forbidden.



3 Due north of the flight line is Lowes Home Improvement

4 North-West of the flight line is Walmart

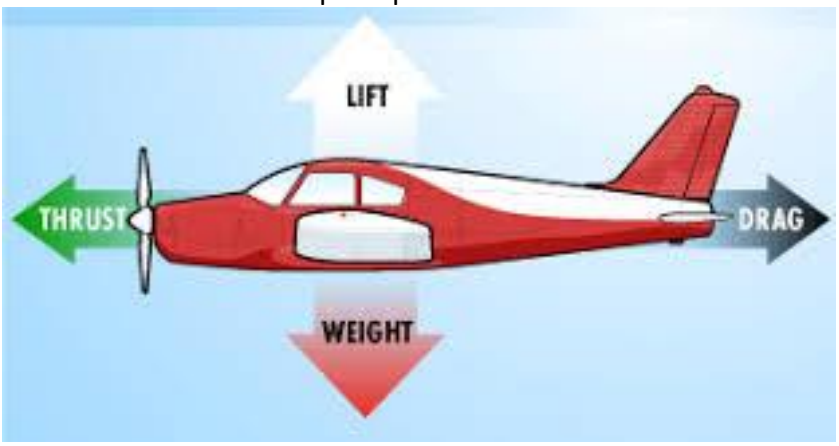
5 New Homes West of the Bus Lot

6 West of the flight line is the York County Department of Education school bus depot

7 York County Solid Waste and Recycling Center

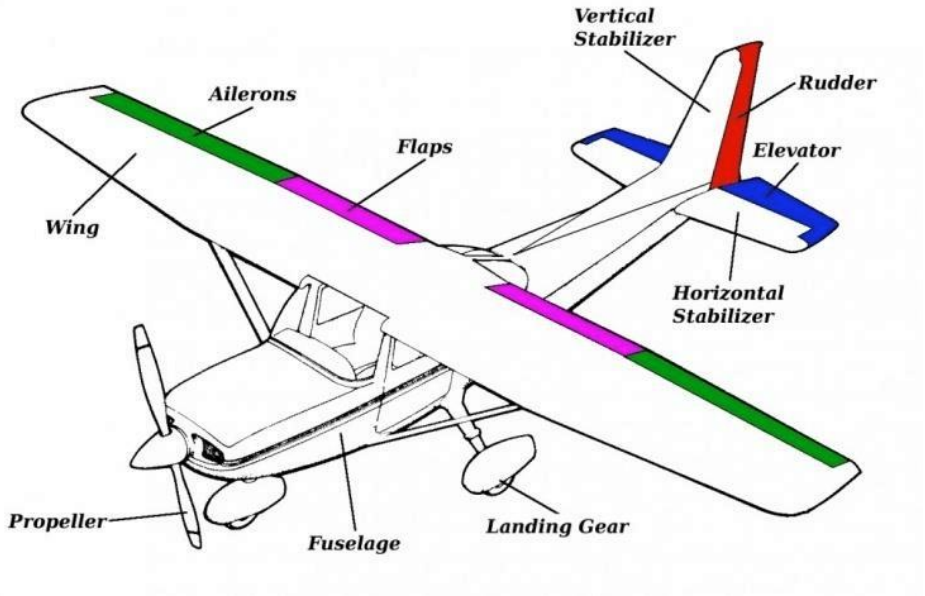
Basics of Flight:

This is a brief (and very basic) introduction to the physical principles that control and allow flight. We will use airplanes (vs helicopters and multirotor aircraft) to explain these principles. However, all aircraft that fly must adhere to these basic principles.



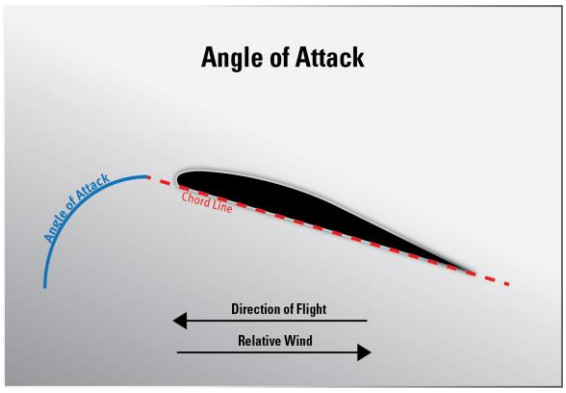
There are four forces that act on an aircraft when it is in flight. These forces are lift, weight, thrust and drag. During straight and level flight the four forces of flight are in balance. When these forces become out of balance the aircraft will leave level flight and the following situations may occur:

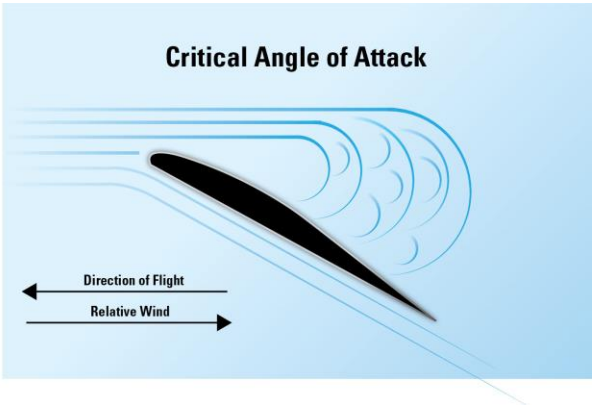
- If lift becomes greater than weight, then the plane will climb upward.
- If the weight is greater than the lift, then the plane will descend downward.
- When the thrust becomes greater than the drag, the plane will accelerate forward.
- If drag becomes greater than the thrust a deceleration will occur.



The illustration above shows basic airplane parts and control surfaces with the proper terminology. Knowing these items and their terminology will help you talk to your instructor and other pilots.

STALLS AND BANK ANGLE





A stall is defined simply as when an airfoil (wing) exceeds its "Critical Angle of Attack" (ie., stops producing lift). Without getting too deep into aerodynamics, it is important for all pilots to understand that a stall can occur at any speed or mode of flight. But most often is associated with too little airflow over the wing (too slow) or in steep turns, such as a misplanned steep turn from base to final.

Remember that with any bank (in a turn), the airfoil will effectively loose lift proportional to that bank angle. If trying to maintain altitude, it is necessary to overcome this loss of lift by increasing the angle of attack, with elevator, which increases lift… up to the critical angle of attack.

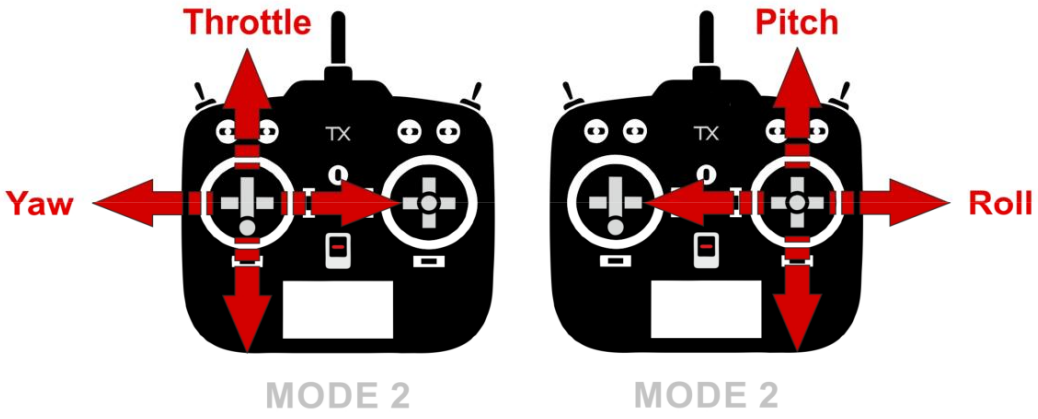
Stall recovery is simple (if there is enough altitude) – reduce the wing angle of attack with nose-down elevator. Once the airfoil is "flying" again (almost immediately), gently pull nose-up elevator and add thrust to regain speed and altitude. Stalls and stall recovery should be practiced – but at a safe "3-mistake altitude" to allow time for recovery.

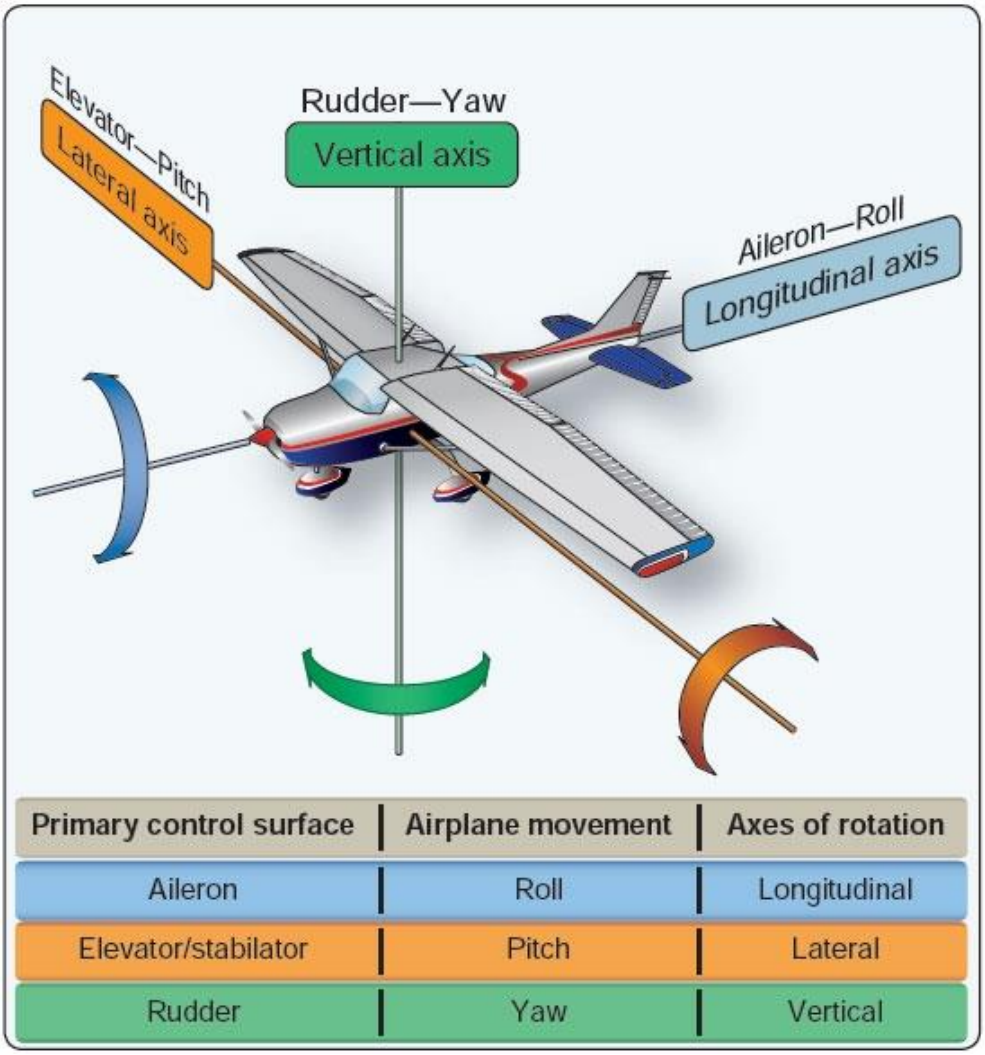
FLAPS

The flaps on an airplane are flight controls that increase lift and increase drag. When lowered, they increase the camber of the airfoil and therefore produce more lift. This allows the airplane to fly at slower speeds (without stalling). With increased lift, there is always increased drag, and generally speaking, up to half-flaps will give increased lift. After that, the flaps main purpose is to increase drag to slow the airplane and allow steeper descents when necessary. Of course they are most useful on approach to landing when you want to fly at as slow a speed as possible (accounting for the wind) and increase your descent angle to land over obstacles. Most trainers will land just fine with no flaps and it is usually helpful to "fly" it (with very little flare) on the runway in windy conditions with a no-flap landing.

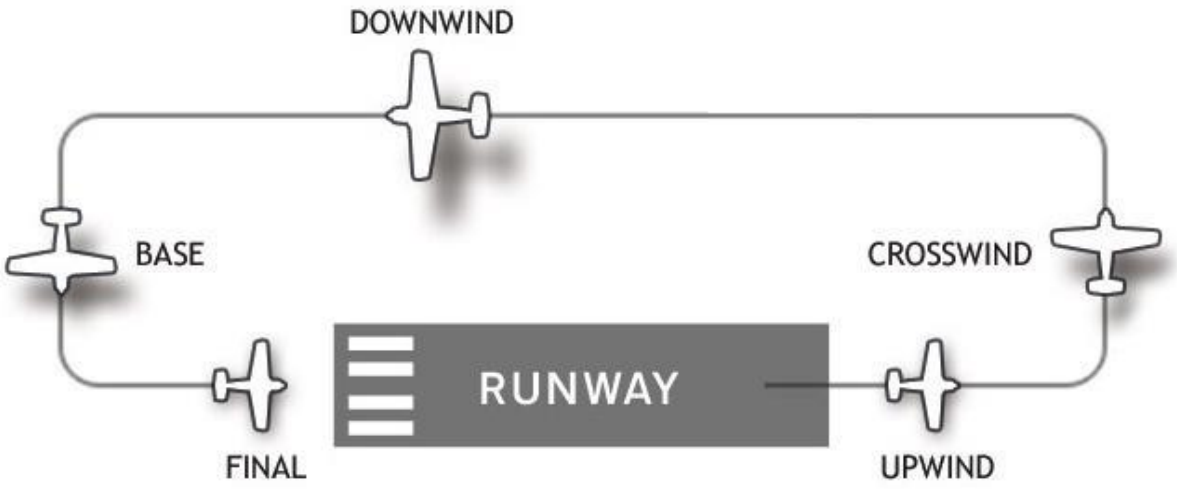
TRANSMITTER

The mode of the transmitter describes which stick controls which of the aircrafts control surfaces. As most transmitters in the United States are set-up on Mode 2, we will briefly go over how the transmitter controls your aircraft.





Primary control surface	Airplane movement	Axes of rotation
Aileron	Roll	Longitudinal
Elevator/stabilator	Pitch	Lateral
Rudder	Yaw	Vertical



The above diagram shows the basic concept of take-off and landing pattern with the terminology describing each stage of the pattern. Learning these items and their terminology will help you understand commands from your instructor. This pattern could reverse as necessary to always try to land into the wind - to achieve minimum t/o or landing roll distance and controllability.

This figure was taken from an article in Model Aviation May 2018 by Dave Scott titled “Maneuver your Aircraft Like a Pro - Minimal, Precise Inputs are Key”

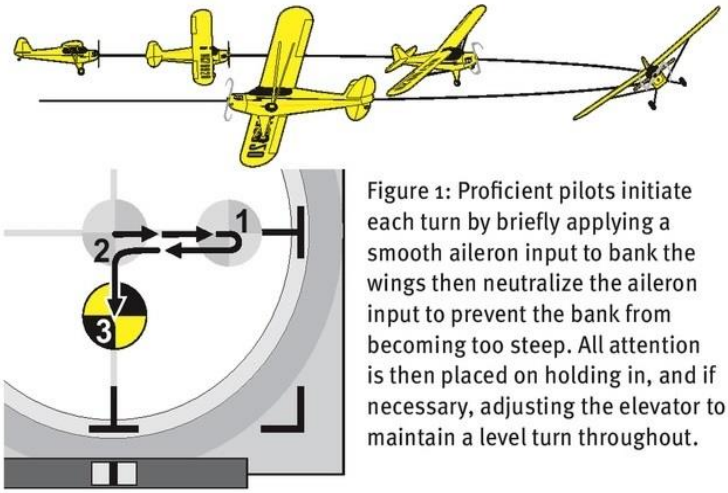


Figure 1: Proficient pilots initiate each turn by briefly applying a smooth aileron input to bank the wings then neutralize the aileron input to prevent the bank from becoming too steep. All attention is then placed on holding in, and if necessary, adjusting the elevator to maintain a level turn throughout.

This is a very good article for pilots that want to increase their skills.

Using this technique will perform a proper aileron turn. A common error made by new pilots is to input control for aileron and elevator simultaneously. Too much elevator will cause the airplane to pitch up sharply at the beginning of the turn.

This basic knowledge will allow you to begin a successful flight training program. Please understand that this is only the most basic knowledge to begin your training. Your instructor will expand on this basic knowledge throughout your training sessions. If there are any terms or concepts that are not clear to you, make sure you ask your instructor to expand on the term or concept.

Basic RC Components:

Here is a brief description of some of the most common RC components you will find in RC airplanes today.

Battery – Most RC aircraft today use Lithium Polymer (LiPo) batteries. They come in a variety of sizes. Make sure you are using the correct battery specified for your airplane.

- Each type of battery has a specific voltage along with the number of battery cells. Each cell has a nominal (resting, not full) charge of 3.7 volts and each cell is identified by "S". Example: a 2 cell battery is referred to as a "2S" and has 7.4v (3.7x2=7.4v). A 3 cell battery is a "3S" and has 11.1v (3.7x3=11.1v), 4 cell is a "4S" and has 14.8v (3.7x4=14.8v) and so forth…
- Batteries also have a "Milliamp Hour" (mAh) rating and a "C" rating.
    - Milliamp Hour (mAh) is the unit that measures (electric) power over time. It is commonly used to measure the energy capacity of a battery. In general, the more mAh the longer the battery capacity or battery life. Think of it as the "*fuel tank*", the higher the mAh, the more "*fuel*" you have. Usually though, the higher the mAh of a battery, the larger and heavier the battery is.
    - "C Rating" is an indicator of the continuous ***discharge*** rate of a LiPo. It allows users to easily calculate the maximum constant current you can draw from the LiPo pack safely without harming the battery. For example, if you have a 3S 1000mAh 20C LiPo pack, your safe max current draw would be 1000ma x 20C = 20A. When charging your battery, it is best (but slower) to charge your battery at 1C. Example: 3300mAh = 3.3Amps. (*just take the first 2 numbers of the mAh and place a decimal between them*)
    - LiPo batteries are safe when handled and charged correctly. Never use a damaged battery! Batteries should never be charged unattended and should be charged in a LiPo safe charging bag.
    - Always set the charger for the specific type of battery (LiPo vs LiFe, NiCd, etc). It is preferred to use the "Balance" setting (your instructor will explain).
    - Batteries that are swollen or "puffed" need to be monitored. This is usually the result of over discharging, over charging, improper storage, physical damage, or age of the battery. Always dispose of properly, not in the trash.
    - It is best to store a LiPo very close to nominal voltage – most chargers have a "storage" setting (approx. 50% discharged.)

A more detailed review can be found at https://rogershobbycenter.com/lipoguide. Don't become overwhelmed though, your knowledge base will grow over time.

Receiver - The receiver in your airplane receives the signal from your transmitter in your hands. When you move the sticks or switches on your transmitter, it sends the signal out and is received by the receiver. The receiver then sends the signal to the appropriate servo and moves the airplanes control surface, throttle, landing gear, etc. to the desired position.

- You must first "bind" a receiver to your transmitter in order for it to work.

- Receivers come with different number of “channels”. A channel is a port on the receiver that a servo plugs into to control something. Some small airplanes may only need 3 channels (throttle, elevator, rudder), while others may need 6 channels (throttle, ailerons, elevator, rudder, flaps, landing gear) or even more!
- You do not need to purchase the same brand of receiver as your transmitter. As long as your transmitter and receiver use the same type protocol (DSM/DSMX and are 2.4 GHz).
- Some receivers even have built in stabilization systems with gyros to help keep your airplane flying straight and level in windy conditions or loss of control.

ESC - The ESC (Electronic Speed Control) controls the RPM or speed of your electric motor. One wire of ESC is plugged into the receiver where it gets its signal, while the other two ends get plugged into the battery. The electric motor receives the 3 wires at the other end of the ESC.

- The ESC is rated in Amps and must be matched to the size and amperage pull of your motor/battery combo. If you have a 30A rated ESC and your motor is pulling 45A when it is turning the prop, you will burn out your ESC! A watt meter is used to verify output, but if manufacturer recommendations are followed, your set-up should be fine. *(A Watt/Power meter is very inexpensive and is almost a necessity to have if flying electric airplanes)*

Servos – Servo motors are electrically powered actuators that move flight control surfaces, operate landing gear, operate nose wheel steering, etc. They get their signal from the receiver and are plugged into one of the channels on the receiver. The more servos you have on an airplane, the more channels you will need on your receiver to plug into.

Brushless Motor - Your electric motor is sized for you specific airplane by the manufacturer. Brushless motors use a standard numbering scheme to describe their physical size and kV rating. For example: let's assume we have a 5055-3000kV Brushless Motor. We break the numbers out as follows: [50] [55] - [3000]

- [50] The first two numbers represent the diameter of the motor's housing in millimeters; in this example 50mm
- [55] The second two numbers represent the length of the motor housing in millimeters; in this example 55mm
- [3000] The numbers after the dash represent the kV rating of the motor; in this example 3000kV. The kV rating (not to be confused with kilo-volt) is the RPM of the motor (k) per volt (V) with no load. For example, a brushless motor with a kV rating of 3000 powered by a 12V (3S) power source would be capable of 36,000 RPMs (multiply 3000x12). This is the max RPMs that this motor can reach under no load. A motor with a higher kV will have more top end speed, but not as much acceleration/torque. A motor with a lower kV will not be as fast, but will accelerate faster and have more torque – to be able to turn a larger propeller for larger aircraft.

Transmitter - The transmitter is the "radio" that you hold in your hand to control the airplane. All RC transmitters and receivers now operate on 2.4 GHz frequency. Once you "bind" your receiver to your transmitter, it is set and will not interfere with others operating their aircraft nearby or from their's interfering with yours. The most popular brand of transmitter is manufactured by Spektrum. It is highly advisable to purchase the best programmable transmitter that you can afford!! You will grow into it, and it will last you a long time. Preferably a 6 to 9 channel programmable transmitter is a good choice.

Propeller - Propellers come in all shapes, sizes and materials, but proper sizing to your specific aircraft is important. The manufacturer will make recommendations on size (diameter in inches) and pitch (distance the prop will move in in a theoretical solid with one revolution). A 12x4 propeller means it has a 12 inch diameter and a pitch of 4 inches per one revolution. Of course, it is the propeller that causes most injuries – *it is extremely important to respect the propeller at all times, assuming the motor may start unexpectedly!* It is ALWAYS best, when working on the aircraft, to remove the prop until finished.

AS3X and SAFE - These 2 terms are used by Spektrum and found on many e-flite manufactured airplanes sold by Horizon Hobby. Both do different things and are sometimes confused with each other.

- AS3X stands for Artificial Stabilization – 3 aXis and uses a gyro system built into the Spektrum receiver. It allows automatic micro-corrections of the flight control surfaces for smoother, more stable flight during windy conditions. AS3X does not get activated until the throttle is advanced past 25%. AS3X *is not* an "auto-pilot" system!
- SAFE stands for Sensor Assisted Flight Envelope
    - SAFE allows for progressive performance modes (Beginner, Intermediate (some) and Experienced). In Beginner mode, SAFE will not allow you to over correct. It limits how far the airplane will bank left/right or climb/descend, no matter how much transmitter stick movement you give. In the Intermediate Mode, it has less limitation on banking and climbing/descending which allows you to be more maneuverable in the air, but there still are some limits. In the Experienced mode, all limits are removed for advanced flying and aerobatics.
    - On most trainer airplanes with SAFE technology, there is a "Panic Recovery" mode that can be instantly activated by a simple push of a button (or release of the sticks to neutral on some) in case you lose control of your airplane. This will instantly bring your airplane back to straight and level flight.
    - There are other receivers available by other manufacturers that have a gyro/stabilization system built into them, or even a "Panic Recovery" mode, but SAFE and AS3X are registered names of Spektrum and allow for the progressive performance modes (beginner, intermediate, (some) and experienced).

With these concepts in mind, it is now time to begin your training!

Method of Instruction:

The teaching method for each task will consist of four parts:

1. **DESCRIPTION**: Prior to take-off, the instructor will describe the maneuver to be done along with any information necessary to do it.

2. **DEMONSTRATION**: After take-off, the instructor will demonstrate how to do the maneuver. The instructor will first perform the task and describe what you should expect during and after the maneuver.

3. **PRACTICE:** The student will then perform the maneuver. It may be necessary to practice a particular task many times before proficiently performing it.

4. **EVALUATION:** The instructor will evaluate the student's progress and determine if more instruction is necessary or if the student is ready to move on to the next task.

Student Pilot Task Goals

Each flying session should start with the instructor and student reviewing and performing the pre-flight checks

Tasks 1 - 3 are to be performed by the instructor with the student present

_____ _____ **Task #1: Prepare Aircraft for Maiden Flight**
Instructor Date

- Review basics of flight section with instructor
- Perform Pre-Maiden Checklist with instructor *(Page 18)*

_____ _____ **Task #2: Perform Maiden/Orientation Flight**
Instructor Date

- Instructor to perform taxi test
- Student to observe maiden/orientation flight. Note ground and flight safety restrictions.
- Demonstrate all flight phases including stalls and recovery

_____ _____ **Task #3: Post-Flight**
Instructor Date

- Throttle Cut Off once landed and finished taxi
- Remove battery (always 1st)
- Turn off transmitter (always 2nd)
- Inspect airplane for damage
- Check battery usage

Tasks 4 - 14 are to be performed with the use of a "Buddy Box" system
(Instructor may T/O and Land initially)

_____ _____ **Task #4: Basic Flight Skills Development**
Instructor Date

- 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.

_____ _____ **Task #5: Turns**
Instructor Date

- Perform constant altitude shallow turns (left & right) at approximately a 20˚ bank angle.
- Perform constant altitude medium turns (left & right) at approximately a 40˚ bank angle.
- Perform constant altitude steep turns (left & right) at approximately a 60˚ bank angle.
- Execute shallow, medium, and steep turns (left & right), constant altitude flight, at low, medium, and full speeds.
- Recognize need for increased elevator and rudder proportional to bank

_____ _____ **Task #6: Taxi/Take-off**
Instructor Date

- Account for wind and runway conditions while taxiing
- Verbalize intentions
- Execute proper upwind takeoff runway alignment.
- Initiate takeoff throttle setting.
- Maintain runway centerline ground steering during takeoff acceleration (rudder).
- Execute takeoff rotation at proper speed.
- Execute proper climb speed, pitch, and bank angle.
- Perform a takeoff abort if required.

_____ _____ **Task #7: Planning Maneuvers**
Instructor Date

- Perform constant altitude rectangular patterns (left & right) as well as figure eights over specific ground location(s).
- Apply crosswind technique (crab and/or rudder) to maintain proper ground tracking during planning maneuvers.

_____ _____ **Task #8: Unusual Attitude Recovery**
Instructor Date

- Recover from student initiated high altitude stall
- Recover from instructor initiated unusual attitude.

_____ _____ **Task #9: Aerobatic Maneuver**
Instructor Date

- Execute aerobatic maneuver.
  Suggested maneuvers:
  Loop, Hammerhead Stall, Aileron Roll, Etc.

_____ _____ **Task #10: Landing Pattern and Go-around**

Instructor Date

- Execute upwind landing patterns (both left and right).
- Execute crosswind landing procedures.
- Perform go−arounds at a 10 foot altitude on final approach.

_____ _____ **Task #11: Full Stop Landing**

Instructor Date

- Execute full stop landing followed by taxi back to taxi way.
- Remember that just because you have landed, don't stop "flying" the airplane – account for the wind.

_____ _____ **Task #12: Supervised Solo Flight**

Instructor Date

- Perform Take-off
- Perform basic maneuvers
- Aircraft should join the established pattern
- Perform approach to landings, go-arounds and a full stop landing

_____ _____ **Task #13: Touch and Go Landing**

Instructor Date

- 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 #14: Execute Simulated Engine failure Landing**

Instructor Date

- Execute simulated engine failure landing.

Tasks 15 - 16 are to be performed by the student with the instructor present

_____ _____ **Task #15: Prepare for Solo Examination**

Instructor Date

- Practice all previous tasks to refine proficiency.
- Instructor will emphasize areas needing improvement.

_____ _____ **Task #16: Solo Examination**

Instructor Date

- If possible, the solo exam should be administered by a separate instructor that has not previously instructed the student.

Solo Flight Examination

Pre-flight

— Perform preflight checklist.

Take-off

— Perform a successful take-off while remaining over the runway (asphalt or grass).
— Two take-off aborts are allowed.

Pattern

— Pilot is to join the established pattern.
— Pilot is to make a minimum of 1 full lap maintaining the pattern.

Planning Maneuvers

— Pilot is to perform a climbing rectangle while maintaining flight within the pattern.
— Pilot is to perform a descending rectangle while maintaining flight within the pattern.
— Pilot is to perform both a right hand and left hand figure eight. After figure eights pilot needs to return to pattern flight.

Aerobatic Maneuver

— Pilot is to perform a minimum of one aerobatic maneuver.
  Examples of acceptable maneuvers:
  Loop, Hammerhead Stall, Aileron Roll, Prolonged inverted flight (including a minimum of one turn encompassing 180 degrees), other maneuver of similar difficulty
— After aerobatic maneuver pilot is to return to pattern flight.

Landing

— Pilot is to perform a successful safe landing on the runway (asphalt or grass, students choice). Go-around as necessary for safe landing. No damage to the airframe allowed. A broken prop or bent landing gear will be allowed.

_____ _____

Solo Flight Examiner Date

Pre-maiden Flight Checklist

General

— AMA number & proper identification - Name and FAA # on aircraft (Recommend phone number also)
— Center of Gravity is properly set.

Transmitter

— Review transmitter menus and be familiar with menu navigation
— Set up airplane according to manufacturer's recommendations

- Aircraft binding (regular binding/SAFE Select)
- Aircraft type
- Servo direction
- Control surface throws
- Throttle Cut-Off (VERY IMPORTANT)
- Dual Rates and Expo
- Flaps
- Timer
- SAFE and Panic Recovery
- Voice Prompts

Structural

— Tail surfaces are aligned and secure.
— Landing gear and wheels secure.
— Ground steering wheel taxis straight.
— Wing is properly secured.

Servos and Control Surfaces

— All servos and servo horns secure.
— All control horns secure - clevises secure with safety retainers.
— All control surface hinges secure with minimal gap. Free and correct moving with no binding.

Engine and Mounting

— Engine mount secure to firewall. Engine bolts secure to mount.
— If required engine is "broken in" and tuned properly.
— Throttle cut set properly and working.
— Propeller & spinner secure - propeller properly balanced & undamaged.

Radio and Batteries

— All batteries including the transmitters are fully charged and secure.
— Control surfaces move in the correct direction (check each flight!).
— Check any additional controls or servos for proper operation, including AS3X.
— All switches in safe and proper position.
— Perform a range check.

Pre-flight Checklist

(Should be performed at beginning of each flight session)

Structural

— Tail surfaces are secure.
— Landing gear and wheels secure.
— Wing is properly secured.

Servos and Control Surfaces

— All servos and servo horns secure.
— All control horns secure - clevises secure with safety retainers.
— All control surface hinges secure with minimal gap. Free and correct moving with no binding.

Engine and Mounting

— Engine mount secure to firewall. Engine bolts secure to mount.
— Throttle cutoff is turned on. (VERY IMPORTANT)
— Propeller & spinner in good condition (without damage) and secure.

Radio and Batteries

— All batteries are fully charged and secure.
— Control surfaces move in the correct direction.
— Check any additional controls or servos for proper operation.
— All switches in safe and proper position.
— Perform a range check (if needed).