

**CG** Center of Gravity, this is the longitudinal balance point of the aircraft. Refer to the aircraft manual for the correct balance point. A CG that is not within the design limits of the aircraft will make the aircraft uncontrollable in flight and it will crash.

**Covering**, The most common are polyester based coverings that have a type of glue on the back that reacts to heat. Additionally, these materials shrink when heated and become very taut. The covering adds a great deal of structural strength to the aircraft. The covering is applied using a heat gun or iron. Commercial names are Monokote and Ultracote.

**Other:**

**CA** Cyanoacrylate glue or "super glue" For model building there are several types of CA. The most common is "Medium gap-filling" This glue bonds skin on contact and many other objects instantly. If you have an aircraft made of foam use "Foam Safe" CA other glues may dissolve your aircraft.

**Resources**

**Mark Twain Hobby Center**  & **The Spirits of St. Louis R/C Flying Club** 

When choosing your first model and equipment and learning how to fly there are two resources for information that you should examine. Your local hobby Center and your local flying club that has a good flight instruction program. Working together Mark Twain Hobby Center and The Spirits of STL R/C Flying Club worked together to compile a chart showing good first airplanes and a list of basic field equipment for a newcomer. The list is certainly not all inclusive but is intended to illustrate some options that are proven trainer aircraft, easy to build and provide reliable performance. When in doubt don't be afraid to ask questions from pilots at the flying field and the R/C pilots at Mark Twain Hobby Center. You may be leaning toward a performance aircraft for your first plane. They look great, go fast, and cost only a little more. If you learn to fly and solo on a trainer you set a foundation of flying that will remain with you throughout your years in the hobby. Even after moving on to more complex aircraft many pilots like to bring out their trainer to get back to basics or just to have a great relaxing flight and remember how it all started.

**Learning to Fly: (The Spirits of St. Louis R/C Flying Club [www.spiritsofstl.com](http://www.spiritsofstl.com))** 

At Spirits we have a comprehensive Flight Training Program and a group of experienced volunteer instructors to assist you through the journey from introductory flight to solo. All instruction is free of charge and takes place at the Spirits' flying field with the best amenities of any field on the area. A 600' long asphalt runway makes takeoffs and landings much smoother, electricity for battery charging, a pavilion for shade, gravel parking and restroom facilities on 12 acres of commercially mowed grass. If you are not sure if you want to get into the hobby contact the Spirits' Chief Flight Instructor to arrange a FREE intro flight. Visit our website's flight instruction area to find out how to contact him.

**How to find Us:**

Use your smart phone and scan one of the barcodes to visit our website for maps to the field and more information:

To visit us use your GPS and navigate to:

73 Amrein Rd., St. Charles, MO 63303

(about 10 minutes from Hwy 94)



**AMA: (modelaircraft.org)** 

The Academy of Model Aeronautics provides insurance and support to R/C pilots and clubs as well as a host of useful information on modeling. All AMA chartered clubs require an AMA membership prior to joining. Talk to a club member about joining.

Information provided by Mark Twain Hobby Center and Spirits Flying Club in this document are for reference only.

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# How to get started with Radio Control Aircraft



a newcomer's guide to the R/C hobby provided by:

**Mark Twain Hobby Center**

and

**the Spirits of St. Louis R/C Flying Club**



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## Introduction

After discussing the best way to help someone get started in radio controlled aircraft Mark Twain Hobby Center and The Spirits of St. Louis R/C Flying Club decided to publish this informational booklet and make it available to everyone. This booklet is not a "How to Fly" or all inclusive knowledge base. Hopefully, it helps you understand radio control terminology, answers a few questions, and provides reliable sources for you find out more about the Radio Control Aircraft hobby.

## Radio Control Terminology

### Types of aircraft models:

**ARF** Almost Ready to Fly, The wings and fuselage are built and covered and varying amounts of assembly are required including installation of the engine, servos, control surface linkage, landing gear, receiver. Plan on spending about 20 hours building your first simple ARF. Almost any model can be nitro or electric powered these days with little trouble.

**BNF** Bind and Fly, This aircraft requires very little assembly and usually comes with everything you need to fly except a transmitter, batteries and or fuel. The landing gear and wings usually requires some assembly.

**RTF** Ready To Fly, This aircraft usually has everything required to get in the air with very little assembly required. The transmitter is included but is generally a very basic system allowing connection to only one aircraft.

**Kit**, This usually means that the box contains a bunch of sticks and sheets of balsa and requires construction of the entire aircraft as well as covering the airframe.

**Foamy**, An airplane whose primary construction is a type of structural foam. Usually electric powered and very durable.

### Types of Fuel:

**Nitro** Nitro-Methane fuel or glow fuel, A mixture of Alcohol, Nitromethane, and a lubricant (castor oil, synthetic oil or a blend). This fuel is used in 2-stroke and 4-stroke Nitro engines. Fuel mixtures are available in 10%, 15% and 30%.

**LiPo** Lithium Polymer battery, A high capacity and high discharge capable battery used by most RC electric airplanes and helicopters to power the motor, receiver and servos. These batteries are rated at 3.7 volts per cell with a maximum charge for each cell at 4.2 volts. A LiPo is described by the number of cells or "S", Total "mAh" of the pack, and the maximum discharge rate of the pack "C". For example a 3S, 2200mAh, 20C LiPo has the following characteristics; Total voltage = 3 cells x 3.7 volts = 11.1 V, 2200 milliamps of power, max discharge of 30 x 2200 mA = 66 Amps.

**WARNING:** Special care is required when charging and handling LiPo batteries. If a LiPo is dropped or punctured quickly remove the battery to a safe area that will not support a fire, like a concrete driveway. Always make sure that you use a charger designed for charging and balancing LiPo batteries

### Aircraft Electrical Parts and Radios:

**Battery** Usually refers to the battery used in a nitro aircraft to power the receiver and servos. These batteries are typically NiCd (nickel-cadmium) or NiMH (nickel-metal-hydride) but may also be LiPo.

**WARNING:** It is critical that the charge level of these batteries are checked after each flight. Low voltage of this battery during flight will result in the receiver losing signal and the aircraft becoming uncontrollable and probably crashing.

**ESC** Electronic Speed controller, a solid state device that interprets signals from the throttle channel of the aircraft's receiver and increases or decreases the electric motor speed accordingly. This device replaces the throttle servo used in nitro aircraft. Many ESCs provide power to the aircraft receiver and servos through an integrated BEC.

**BEC** Battery Eliminator Circuit, this electronic device integrated into an ESC or stand alone provides regulated electric power to the aircraft's receiver and servos. Many of these systems allow the voltage to be adjusted between 4.8 and 7.4 volts

**Transmitter**, The radio that is used to communicate with your aircraft receiver. The device is characterized by the number of channels that can be controlled 4, 6, 8, etc. Most current transmitters sold operate on a frequency of 2.4GHz and do not require specialized crystals for designated frequencies. Older radios operate on FM and required dedicated crystals for each model. Additionally, FM radios may use the same channel. Because of this strict rules are set forth for anyone using FM radios to prevent accidentally controlling someone else's aircraft.

**Receiver** A radio component that receives signals from your transmitter and controls the movements of servos, an ESC or other device. It receives power from the receiver battery pack or BEC. Receivers are rated by the number of channels they can receive and control, i.e. 4, 5, 6, 7, 8, 9, 10, 12. Receivers must be matched to your transmitter.

**Servo**, A small electric motor controlled remotely to move the control surfaces, throttle, landing gear and other components.

**Glow Plug** A small device used in nitro engines to allow continuous combustion of fuel after starting the engine. A glow plug looks like a small spark plug. A 1.5 volt electric current is sent to the glow plug by a glow driver or other electrical connection.

The electricity heats a platinum wire in the center of the plug that is exposed to the atomized fuel and air mixture in the combustion chamber allowing the fuel to explode and move the piston. After starting the heat from the combustion stroke keeps the glow plug HOT and in turn allows combustion to continue.

### Support Equipment: (usually in a box called the Field Box)

**Glow Driver** A device that contains a 1.5 volt battery, NiMH or NiCd that has a stem that connects to a glow plug during engine starting. Some kits come with their own battery and charger for the driver. Some can connect to a power panel on your field box.

**Fuel Pump** A device used to transfer Nitro fuel from the container to the aircraft's fuel tank. This device may be manual using a hand-crank or electric. An electric pump will run off of the a 12V battery if you have one for your starter.

**Starter** Usually a 12 volt electric motor with a rubber cone mounted on the shaft, The rubber cone is placed on the aircraft's spinner to turn the spinner while starting a nitro engine. The starter may be connected to any 12 volt source or may have its own battery. Sealed 12V batteries area available to mount in your field box. You will need a charger for the 12V battery.

### Aircraft Parts & Controls:

**Prop** Propeller, or airscrew. For most electric planes the props are plastic and specially made for electric motors and usually have an E in the prop description. For nitro engines the prop may be plastic, glass fiber, wood, or carbon fiber. The prop is described by its diameter and twist. For example a 10x 6 prop is 10 inches in diameter and the twist of 6 will push a column of air 6 inches during one complete rotation. Always inspect props prior to flight and do not use a cracked prop.

**Spinner**, The nose cone on the front of an airplane that is mounted to the propeller.

**Fuselage** The long body section of an airplane or the body of a helicopter.

**Empennage** The part at the rear of an airplane that include the horizontal and vertical fins or stabilizers. Also referred to as the "Tail Section" or "Tail Feathers". This section adds stability and control of the aircraft in the Pitch and Yaw axis.

**Wing** The wing is an airfoil that provides lift as a result of the difference in velocity of the wind as it passes over the top and the bottom creating a pressure differential that lifts the aircraft into the air. Wings have many shapes and designs and may have ailerons and or flaps.

**Dihedral**, The upward angle of the wing on a plane as measured from the fuselage to the wing tip. This adds stability to the aircraft and allows the airplane to fly level and correct itself to some extent. Think of the fuselage hanging between the wing tips.

**Control Surface** A part of the aircraft that is connected to the airframe and moves via a servo motor by remote control. The movement of the control surface alters the flow of air around the aircraft and therefore causes the aircraft's attitude to change around the pitch, roll and or yaw axis.

**Elevator** A control surface that is located on the horizontal stabilizer that controls the Pitch axis.

**Pitch Axis** Controlled by the elevator, pitch is the position of the nose of the aircraft relative to the horizon. If the nose is up typically the aircraft is climbing. If it is down it is descending. Pitch is controlled by the up and down movement of the "Right Stick" of your transmitter.

**Ailerons** A control surface located on each wing that controls the Roll axis.

**Roll Axis** Controlled by the ailerons roll is the position of the wings of the aircraft in relation to the horizon. An aircraft rolls around the long axis of the aircraft, typically the fuselage. Roll is used to turn the aircraft left or right. Roll is controlled by the left-and-right movement of the "Right Stick" of your transmitter.

**Rudder** A control surface that is located on the vertical stabilizer that controls the Yaw axis.

**Yaw Axis** Controlled by the rudder, yaw is the alignment of the fuselage with the direction of travel of the aircraft. Simply put, the position of the nose relative to the direction of travel. Rudder is used while taxiing and to coordinate airplane turns in flight. Yaw is controlled by the left-and-right movement of the "Left Stick" of your transmitter.

**Aircraft Attitude**, The position of the aircraft relative to its 3-axis pitch, roll and yaw and the horizon.

