

The *Beginner's Guide* To Flying RC Airplanes



P. Carpenter

The Beginner's Guide to Flying R/C Airplanes

by Pete Carpenter

(Free sample version only, with very limited content. Full version available at <http://www.rc-airplane-world.com/beginners-guide-to-flying-rc-airplanes.html>)

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**IMPORTANT: You are reading a 'taster' version of my e-book, with very limited content. For the full 136 page version, please visit:
<http://www.rc-airplane-world.com/beginners-guide-to-flying-rc-airplanes.html>.**

Excerpts from the book begin below....

Preface

This *Beginner's Guide to Flying R/C Airplanes* book has come about as a combination of my personal passion for radio control flying, and an ongoing desire to help folks get started in this very exhilarating and addictive hobby.

I've been involved in aeromodelling (building and flying model aircraft) since the early 1980s. From the simple rubber powered balsa planes flown in the field behind my parents' house, to multi-channel radio control aircraft (gliders, glow powered and electric powered planes, plus the occasional helicopter), my love of aeromodelling has never waned. The photo to the right shows me somewhere back in those early 1980s, launching a free flight rubber powered *Super Cub*. Nowadays a plane this size can be radio controlled - an unthinkable idea back then!



With the advent of the internet, my passion for R/C flying helped me create a website about the hobby (rc-airplane-world.com), to share my enthusiasm and to promote the hobby to others. A natural extension of the site was to write an e-book, which first became available in 2009 and has, to date, helped more than 3000 people get started in this fantastic pastime. The website has helped many more, over the decade that it has been up, and it makes me happy to know that I've played a small part in getting people in to radio control flying, all around the globe.

As the name implies, *The Beginner's Guide to Flying R/C Airplanes* is exactly that – a beginner's guide. If you have been contemplating getting in to the hobby of radio control flying, but haven't a clue about what's involved, then this book is for you. If you've already successfully flown an R/C plane on your own then it's probably not for you, although it does contain plenty of information which you might not yet be familiar with. Certainly for the complete newcomer to the hobby, this book *will* give a solid foundation on which to build your knowledge and learning.

What you should get from this book

Being a beginner's guide, the information contained within this book intentionally never gets too technical. As you progress through this fantastic hobby you'll get to learn more and more, but overwhelming you with detailed technicalities at this early stage is just pointless; having information overload just as you're starting a new pastime is never that beneficial - learn the basics first, and progress from there!

The pages in this book *will* help you get started in radio control flying and will break things down for you so that you don't get too overwhelmed by all there is to learn in the early stages of your new hobby. The book has been written to introduce you to the joys of flying R/C planes and to give you a solid foundation on which to build your experience.

By reading these pages you will learn the things you need to know as a beginner R/C pilot, and you'll get the information from a structured, step-by-step layout. You'll get a fundamental understanding of radio control systems and how they work, how a radio controlled plane is made to do what it does, how to choose a good first plane and how to complete your first flights – plus lots more in between. (**Full preface is 3 pages – [get it here](#)**)

Chapter 1 excerpts...

1 : An introduction to your new hobby

The pastime that you're entering into is one full of rewards and satisfaction; a pastime that will take you on a fulfilling journey from the comfort of your hobby room to the great outdoors! Not many hobbies have the potential to teach you such a diverse range of topics, or at the same time be as simple and straightforward as you want it to be. In other words, you can throw yourself into the model building side of the hobby as much as the flying side of it and learn about model plane design and construction techniques, aerodynamics, mechanical issues, model engines, electronics - the list goes on - or you can just buy a simple electric Ready To Fly (RTF) plane, charge the battery and go! This latter scenario is what this book assumes is going to happen....

...Electronic auto-stabilisation technology is another area that is rapidly changing the face of the hobby, as we continue to progress through the revolution. Some beginner planes now come with artificial intelligence as part of the package, to make learning to fly as easy and as crash-free as possible. A plane that can self-correct its attitude, and cancel out any unwanted movements caused by gusty conditions? A beginner's dream, surely!...

...As a direct result of these vast improvements in the hobby, and the wide choice of EP beginner planes now available, more and more people around the world are being drawn to flying radio control planes. And as for availability, the planes aren't restricted to being sold in specialist model shops any more; these days you can walk into a toy shop and pick a radio control aircraft of some type off the shelf. However, while this wide availability means that buying a radio control plane is easier than it ever has been, which is a good thing, it also means that you're not always going to get the specialist advice that you might need – and that's not a good thing. Hopefully this book will steer you in the right direction when it comes to buying your first R/C plane, as you'll read in Chapter 4....

Chapter 2 excerpts on next page...

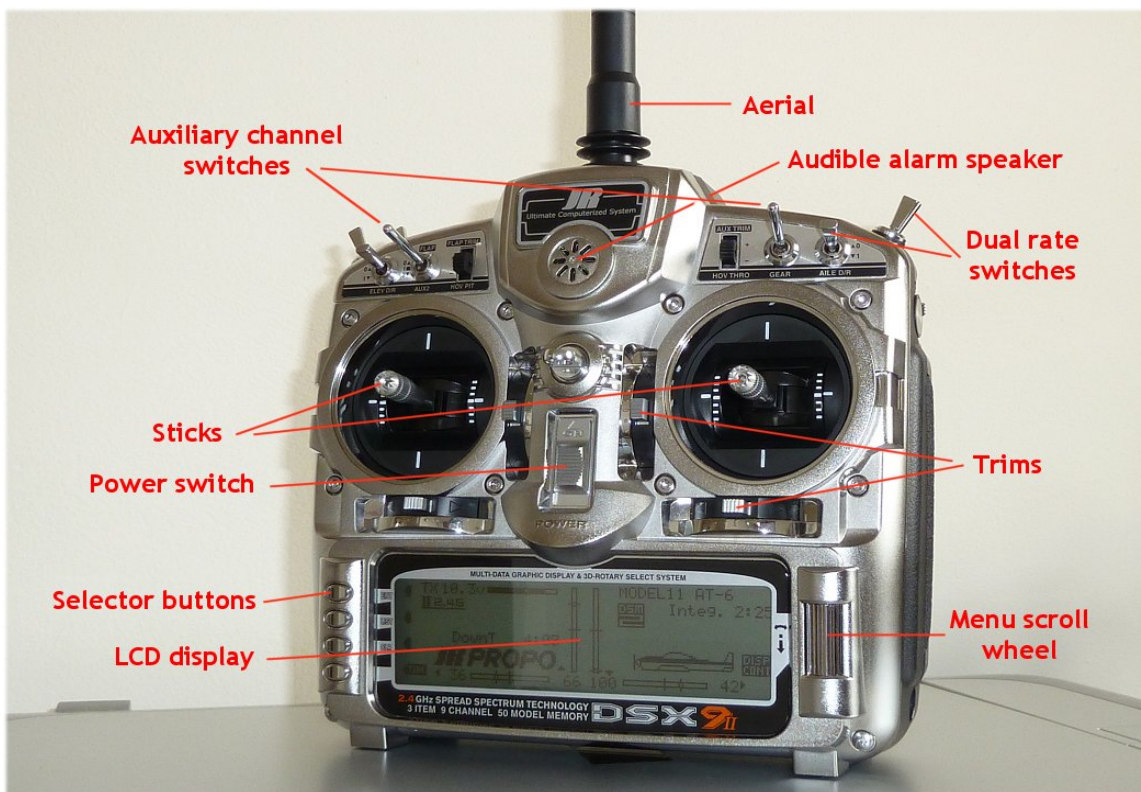
2 : R/C systems, plane controls & EP powertrains

How your R/C system operates.

I'm not going to go into the electronic technicalities of how radio signals are transmitted and received, firstly because this isn't a course in radio transmission and reception and, secondly, I barely understand that kind of thing myself; like catching up with someone on the other side of the world by video call on a mobile phone, I just accept that it can be done! But essentially, your R/C transmitter transmits a radio signal each time you move a stick or flick a switch, and that signal is picked up by the receiver located inside the model. The job of the receiver is to pass the signals on to the servos, which it does via small electrical wires. The relevant servo then responds to the signal from the receiver with proportional movement of its motor; the motor drives the servo gears and output shaft which in turn moves the servo horn. The horn is connected, via a linkage, to the control surface of your plane. So, the end result of you moving a stick or flicking a switch on the transmitter is movement of your plane's control surface, or control of the motor power, or some other function.

So let's now take a quick look at those aforementioned components of a radio control system, and at the same time we'll compare a traditional MHz (megahertz) system to a newer 2.4GHz (gigahertz) spread spectrum system, just to outline the fundamental differences. After we've gone through the different R/C system components, we'll then take a look at the controllable functions of the plane and see which does what, and why...

The transmitter



The transmitter is the heart of the radio control system and is the box that you hold and use

to control your plane. As we already know, each time you move a stick or flick a switch on the transmitter, a radio signal is transmitted via the aerial (antenna).

You'll often see the word 'transmitter' referred to as just 'Tx' or 'tx'. This is a very common abbreviation and is widely used throughout the radio control hobby; not only will you see it written but you might also hear it being said eg "*Can you pass me my Tx?*". Another very common name for the transmitter is just *radio*. Traditionally this name was mostly used in North America, but as the world has shrunk with the use of the internet, and the hobby has reached to all parts of the globe, so the use of the word 'radio' to describe an R/C transmitter has also spread, and it's now very common to hear it all around the world. Personally I never ever used to call my transmitter a radio, but now I often find myself referring to it with that name!...

Understanding the primary R/C plane controls

So now you have a basic understanding of how your radio control system works, let's take a look at the basic controls of an R/C plane and see how moving a stick or flicking a switch on the Tx directly influences what happens to the plane. But before we do that, let's briefly touch on how a plane flies in the first place, since this will help you understand the effect of moving control surfaces.

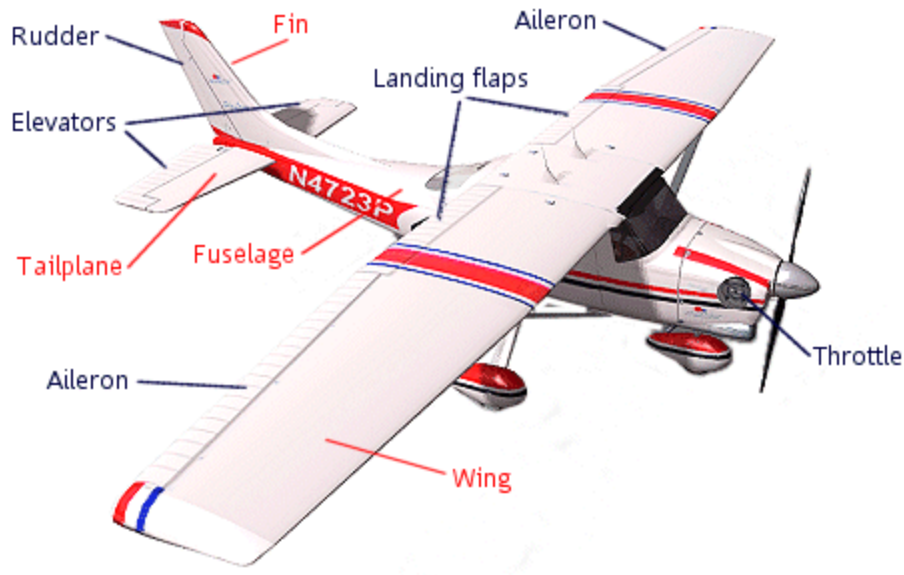
There are four major aerodynamic forces acting on a plane in flight: lift, weight (*i.e.* gravity), thrust and drag. For a plane to get airborne, the thrust needs to exceed drag and lift needs to exceed weight. *Thrust* is the force produced by the engine turning the propeller, to move the plane forward. *Drag* is the friction of air molecules against the plane's airframe, as the plane flies through the air. *Weight* is obviously the weight of the plane and the force of gravity acting on it. *Lift* is the upward force produced by the plane's wings.

Lift generation is a complex subject (I've heard Aerodynamics Engineers argue about it!) but lift is essentially generated because of the Angle of Attack (AoA) of the wing, which is the angle of the wing as viewed end-on, in relation to the oncoming airflow, and the airfoil (or aerofoil) section of the wing, which is the cross-section shape of the wing. Both of these act together, as a plane moves through the air, to create a difference in air pressure over the wing - higher pressure below the wing and lower pressure above the wing. The resultant force of this pressure gradient is lift, and if the lift force being generated is greater than the weight of the plane (and the thrust is greater than the drag), then the plane will fly. Obviously when the amount of lift being generated varies, then this will have a direct effect on the plane's vertical movement in the air.

Aside from the AoA and airfoil section of the wing, *airspeed* is also crucial to lift generation. More speed equals more lift, so the faster a plane flies the more lift gets generated by the wings. It goes without saying that if there is no airspeed at all, then no lift gets generated!

Really, at this early stage in your new hobby, that's all you need to know about how planes fly. As previously mentioned, lift generation and aerodynamics is a complex subject and a whole other book, but for now you only need to understand the very basics of lift generation, so you can relate how a plane flies to how it is controlled, which is what we can look at now...

The primary flight controls found on a plane are throttle (engine/motor power), elevator, rudder and ailerons. Landing flaps are another useful flight control but it's unlikely these will be on your first R/C plane - it's important to understand them, nonetheless. The following picture shows where on a plane these controls are found, and the four major parts of a plane have also been labelled (in italics), just in case you're unsure...

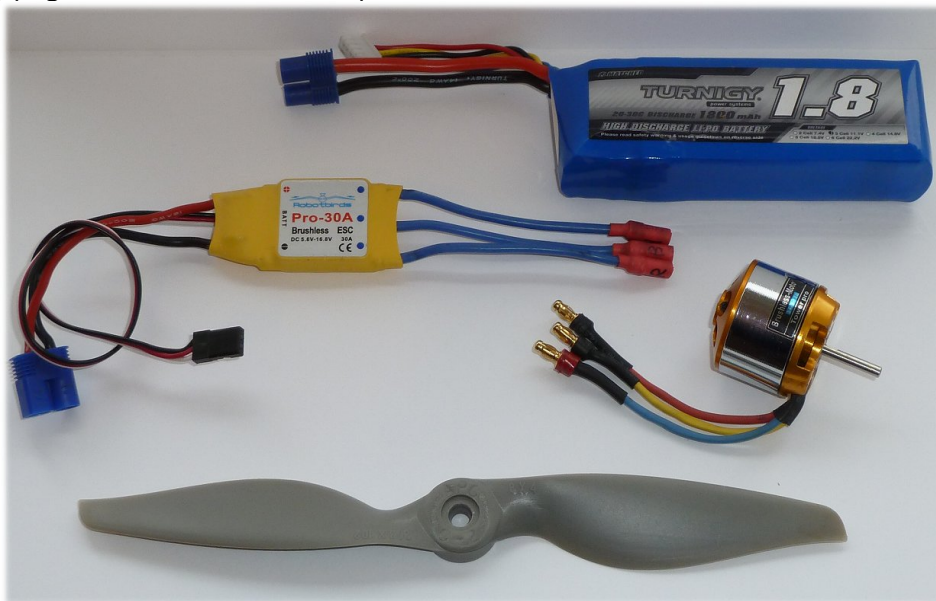


Now let's take a look at each control separately and see how it effects the plane in flight...

More excerpts from the same chapter...

EP powertrain components

While this chapter is primarily about radio control systems and the plane controls, it's equally important to get a basic understanding of the components of an EP plane's powertrain. By *powertrain* I mean all the bits that collectively deliver the power, and these components are the flight battery pack, electronic speed controller, motor and propeller - all shown in the picture on the following page, in that order from top to bottom:



Without delving too deeply into the technicalities of each, here is a brief round-up of each one...

Flight battery pack

The flight battery pack, also just called a flight pack, provides energy to the motor and, in most electric planes, the receiver and servos too. The packs can be of different cell types (their chemical make up) but the majority these days are lithium polymer, commonly abbreviated to Li-Po, LiPo or lipoly. These packs have all but replaced the nickel-based (NiCD & NiMH) packs, although NiMH motor packs are still used here and there.

A single Li-Po cell has a nominal voltage of 3.7V (volts) and so packs can be bought in increments of 3.7. A fully charged cell has a voltage of 4.2V, while the recommended minimum discharge level is around 3V per cell. Regular over-discharging of Li-Po cells can damage them beyond repair.

While single Li-Po cells are used in the 'ultra micro' type R/C planes, a Li-Po *pack* is made up of two or more cells. Your average 'park flyer' electric plane will typically use a pack made up of 2, 3 or 4 cells and these packs are given an 'S' label, with a number denoting how many cells the pack has - 2S means it has two cells, 3S means three cells and so on. The cells are wired together in series, which means each individual cell's voltage gets added together to give the overall pack voltage. For example, a 3S pack will have a nominal voltage of $3 \times 3.7 = 11.1V$. Fully charged it will be $3 \times 4.2 = 12.6V$.

(Full chapter is 27 pages covering all radio system and powertrain components – [get it here](#))

Chapter 3 excerpts on next page...

3 : Methods of R/C flight training

This book assumes that you intend to self-teach, with an electric powered park flyer type plane, but it's important to introduce you to the options you have when it comes to learning to fly a radio control aircraft of *any* type. These are:

- One-to-one tuition with a certified instructor, club instructor or experienced R/C pilot.
- R/C flight simulator on your personal computer.
- Self-teach without any simulation time or outside help.

One-to-one tuition

As with learning any kind of new skill in life, getting someone with some degree of experience to show you the ropes is without doubt the best way to find your feet and get going. Radio control flying is no different and having side-by-side instruction on how to fly your plane is highly recommended and is inarguably the better option, especially if you choose to start out with a glow plug powered plane rather than a simpler electric one. But it does have to be said that *not* having access to such instruction isn't going to prevent you from successfully learning to fly an R/C plane; indeed, as previously mentioned this book has been written with self-teaching in mind.

Joining a local R/C flying club is your best bet for finding good one-to-one tuition; many clubs have official radio control flight instructors who are certified by the national body of model flying for that country *i.e.* the pilots have passed strict flying tests to earn them recognition as qualified instructors in radio control flying. If your club doesn't have such certified instructors then there should at least be a few experienced club pilots who will be more than willing to teach you, and many clubs have 'nominated' instructors who aren't officially qualified to give flight tuition but have been voted by other club members as experienced enough and worthy of the job.....

R/C flight simulators

In these modern times of warp-speed home computer processors and graphics cards, an R/C flight simulator ('sim') is a very realistic and desirable training aid. Learning to fly radio control planes (and especially helicopters) on an R/C sim is a very sensible and popular option these days.

There are several top quality simulators currently available to buy, as well as a freebie download one that will let you learn the basics but do leave a bit to be desired when it comes to sheer realism.

The *RealFlight G* series (G4.5 pictured below) and the *Phoenix* sims are about the two most popular choices; I have both and can personally recommend either one of them although Phoenix is slightly more realistic. Both simulators, at the time of writing, can be bought in different versions with or without a controller or transmitter (RealFlight uses a purpose built controller whereas Phoenix uses a proper R/C transmitter, although RealFlight does support Tx use via the controller).

Using your own Tx with a flight sim is more preferable to a transmitter-based controller simply because it will get you familiar with the feel of it for when you're using it at the field. Having said that, though, using the RealFlight controller, as shown in the photo, is no bad thing and perfectly acceptable; this particular controller is manufactured by Futaba and is modelled on one of

their actual 6 channel transmitters, so is perfectly realistic in terms of how it feels in the hands.



Self-teach

You'd be forgiven for thinking that 'just getting out there' with your brand new R/C plane with no instructor beside you and no sim-time under your belt would be a pretty foolish thing to do! But the fact of the matter is that plenty of folks do do exactly that – they take a deep breath and get their plane pointing skywards without anyone to hold their hand in the process.

Teaching yourself to fly a radio control plane is an acceptable thing to do, especially in this day and age of Ready To Fly electric beginner planes. Indeed, this book is here to help you do exactly that and, again, that's why this *Beginner's Guide to Flying R/C Airplanes* focuses on an electric park flyer type plane – because you can realistically just get out there with such a craft and take to the skies without too many complications – so long as common sense and responsible behaviour prevail!... (**Full chapter is 4 pages – [get it here](#)**)

Chapter 4 excerpts on next page....

4 : Choosing & buying your first R/C plane

The correct choice of plane as your first one is going to have a big impact on your enjoyment of and success with getting started in radio control flying. Quite simply, if you buy the wrong kind of plane your first flight will likely end in disaster, probably seconds after take off, and you'll possibly lose all interest. I can't stress enough the importance of taking a bit of time and care when choosing your first plane, and this is actually a downside (about the only one) to the vast choice of radio control planes on the market these days – you can become very easily overwhelmed by the variety of planes out there, and if you don't know what you're looking for then it's all too easy to get impatient and make a bad purchase.

Also, the volume of cheap, lesser quality planes being churned out of the Far East these days is a danger. It's true that many known and reputable brands have their products manufactured in Chinese factories but such manufacturers generally have a thing called Quality Control, and as a result the products are (usually) very good – or at least very acceptable! But there are also lots of "Who?" manufacturers out there who seem to have forgotten about having a QC department, and the products can be very questionable indeed – both in build quality and performance. Such models typically appear for sale online at prices that seem too good to be true, and the old saying of "*You get what you pay for*" certainly holds true in the radio control flying hobby. Admittedly there are some *genuinely* good value planes out there, but you do need to be very careful when buying.

So then, let's take a look at what you need to consider when buying your first plane...

Design of plane

This is a fundamental issue and the one you should initially look at, regardless of whether you're going down the electric or internal combustion power route.

In the R/C flying hobby there are planes called trainers, and they're called this for a very good reason – they're used to train new pilots! The obvious characteristic of a trainer plane is the high wing configuration *i.e.* the wing sits on top of the fuselage, above a cabin area. Trainers will be your 'stereotypical' basic plane shape with single motor at the front, parallel wings (not swept), box-section fuselage and single fin and tailplane. The landing gear might differ between taildragger and tricycle, but more on that later.

In contrast, a radio control F-117 Stealth Fighter might look a bit sexier but it's flying characteristics aren't going to be too friendly, and this is the kind of plane that you'll have a nasty experience with. The flight characteristics of a traditional trainer will be much more forgiving, and that's exactly what you need when learning to fly radio control planes.



Above: choose your first plane wisely or suffer the consequences!

Another design that's perfectly suitable for beginners, and mustn't be overlooked, is the 'pusher' type electric plane/powered glider, such as the...

...One type of plane that you'll almost certainly be drawn towards is the warbird; *P-51 Mustang*, *F4U Corsair*, *Supermarine Spitfire* etc. I can understand that the urge to rush out and purchase such a sexy beast is strong, but warbirds don't really make suitable first R/C planes because they're generally faster and don't exhibit the ultra-stable flying characteristics of a traditional trainer or powered glider. These two factors are going to combine and work against you when you're first learning how to fly. But for a second or third plane, when you've got some experience under your belt, an R/C warbird is almost a must-have model!...

Buying your first R/C plane

In this day and age we're swamped with options for buying radio control products. Because the hobby has exploded in popularity in recent years there has been an inevitable increase in the number of shops selling the stuff, both online and in the high street.

That's good news and bad – good because buying an R/C plane has never been easier or more affordable than it is now and availability is certainly no problem, but bad because the massive choice of places to buy from can lead the unsuspecting buyer through a complete minefield. Potentially he or she might end up buying something from a very dubious seller who has no intention of offering any kind of after-sales support or help if the purchase doesn't go smoothly. There are plenty of those sellers around, so beware! (**Full chapter is 14 pages covering all aspects of choosing and buying your plane – [get it here](#)**)

Chapter 5 excerpts on next page...

5 : Get to know (& assemble) your plane

Here we go then.... You've now learned about R/C systems in general, the primary controls of a plane, ways of learning to fly radio control planes and what you should and shouldn't buy for your first one. It's now time to assume that you've bought a sensible, trainer-based plane (realistically you probably haven't yet, but are sensibly reading this book from cover to cover first!...) and this chapter will show you how to get familiar with it, and what to expect when you open the box. Remember, we're focusing on an electric RTF trainer, for convenience.

Getting your very first radio control plane is an exciting moment, no doubt about it - it brings out the kid in all of us! And by the way, that feeling doesn't go away – you'll feel the same when you open the box of your 100th plane!

The desire to throw it all together and rush out to the nearest field is strong, but taking your time and getting familiar with the plane is essential if you want to get the most out of what you've just bought. Being patient and taking some time at this early stage will reward you in the long run, so resist that urge to grab the plane and go.....

....So the first thing to do, then, is remove everything from the box and lay it all out on a flat surface and see what you've got. Inspect all the parts to make sure that nothing has been damaged in transit (it does happen) and just spend a few minutes looking at it all, familiarising yourself with everything. If the instruction manual has a 'parts listing' page then study it closely and check that all the pieces are there, and that nothing is missing (that can happen as well). If you do find any damaged parts, or something major is missing, contact the seller immediately and tell them, and don't do anything else to the plane until they've told you what to do. This is very important because many sellers won't offer replacements or refunds if the product has been tampered with in any way *i.e.* in this case assembled.

If you think that there is an issue with your new plane, don't give the seller a hard time; it's more than likely that any damage was done during the delivery route, and any missing parts were just not put in at the factory. If you jump down the seller's throat on the phone, you're less likely to get a courteous and helpful response.

I know from personal experience how annoying and frustrating a damaged or incomplete model/product is, but the seller is rarely to blame. ...

Chapter 6 excerpts on next page...

6 : Preparing your plane for flight

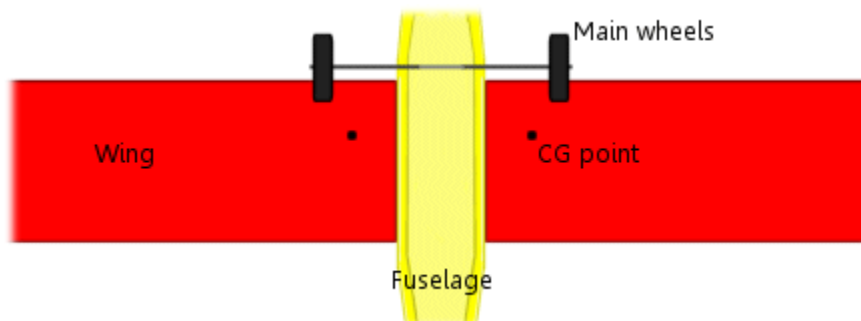
The previous chapter saw you unpacking your newly purchased plane, studying the instructions thoroughly and carrying out any required final assembly work to get your plane more or less ready for flight. This chapter is going to cover the very final few things that you need to do, particularly checking the *weight and balance* of the completed plane.

Every flying aircraft has a *Centre of Gravity*, which is commonly abbreviated to just CG, CoG or C of G. The Centre of Gravity is factored in at the design stage of a plane's life, and is the longitudinal balance point of the plane *i.e.* the point through which the *weight* force acts and where the whole plane balances correctly about its lateral axis. The fore-aft position of the CG drastically effects how a plane handles in the air, and consequently is critical to safe flying and a plane's survival!

CG positions vary from plane to plane but as a general rule of thumb the CG point can be located anywhere between one quarter and halfway of the wing chord (width) back from the leading edge of the wing. Again, this is a generalisation but that approximate range does apply to the majority of R/C planes, particularly trainers.

The important thing to do is find out exactly where the correct CG is for your plane and this information should be somewhere in the instructions. There should either be a diagram showing the correct CG, or the position of it may be referred to in text – for example the instructions might state "*Centre of Gravity 3 inches (75mm) back from leading edge of wing*". Note that some manufacturers will state the CG as a distance back from the nose of the plane. Same difference, but distance back from the wing leading edge is more common. A CG that is marked on a diagram of a plane (either plan view or side-on view) will be denoted by a small circle divided up into quadrants of alternating black and white; this is the standard CG symbol.

However it's described in the instruction manual, be sure that you know the exact position of the CG of your plane and mark it on the underside of each wing with a marker pen or small sticker, if it isn't already marked by the manufacturer. Some foam planes have the CG location moulded as a small dip or bump on the wing, or balsa planes might have a small circular sticker to indicate its position. If you have to mark it with a pen, don't go mad - just a small dot is sufficient so that you can see the exact point. Make the mark a couple of inches or so away from the fuselage side, one mark on each wing. It's obviously a lot easier to do this with the plane upside down. The following illustration shows the view of the underside of a trainer, the two CG marks are shown as black dots roughly where you would expect them to be:



(Full chapter is 11 pages including all pre-flight checks, how to adjust control surfaces and much more – [get it here](#))

Chapter 7 excerpts....

7 : Finding a suitable flying site

If you've chosen to join a local model flying club then finding a good place to fly isn't going to be an issue. But not everyone can or wants to join a club and so flying in a public area or from private land are the only alternatives.

If you're lucky enough to own or have access to land spacious enough to fly your R/C plane in, for example if you live on a farm or if your home backs on to or fronts a lot of empty and unowned space, then you're certainly in an enviable position! This is an ideal situation because you can fly without the worry of 'local figures of authority', shall we say, tapping you on the shoulder with an "*Oi! You can't fly that thing 'ere!*"!

Similarly, if you know a friendly farmer who is happy to share a corner of one of his fields with you then this too is a great situation to be in. Not all farmers are so obliging though, so it's very important that you seek permission and approval to fly a radio control plane from someone's field, before you actually do it. And while on the subject of farm flying, be very careful if flying over a field of tall crop such as corn or wheat. Many R/C planes have been known to vanish from existence after landing - or crashing - in tall crops, only to reappear again weeks or months later as a pile of bits going through the farmer's harvesting equipment. Not good. Seriously, losing a plane in crop is all too easy - even if you think you know exactly where it went in. Another good reason to write your name and phone number on your planes!

Private and unowned land, and flying club fields aside, your last option is to fly from a public space and this is a very common thing to do – it's the very reason why park flyers are called park flyers! So let's have a look at that option...

Size and layout of flying area

You'll remember back in chapter 4 that we talked about the size of your first plane, well this obviously has a direct impact on the size of your flying area; bigger planes need more airspace and vice versa. For the 'recommended' size electric plane (40" to 50" wingspan) an area of a standard football (soccer) field is about the minimum size area you need to be thinking about. It's not an easy generalisation to make, but that should give you a rough idea of the size of area you need to be looking for. A micro size plane can, of course, be safely flown in a much smaller area than that.

The layout of the flying area is important, and the primary feature you need to look for is...
(full chapter is 3 pages – [get it here](#))

Chapter 8 excerpts on next page...

8 : Pre-flight checks

All pilots of full size aircraft run a series of pre-flight checks immediately before taking off; last minute checks to make sure that everything is functioning as it should be. Radio control planes require similar checks prior to each flight, just on a smaller scale!

Precise pre-flight checks are going to vary from plane to plane, depending on the features of the plane, how many channels it has etc., but there are certain fundamental checks that all R/C planes require and it's of paramount importance that you get in the habit of carrying them out before each flying session, and the *very* essential ones should even be done before each flight.

By carrying out the checks listed below, you'll be making sure that your plane is in an airworthy condition and safe to fly, and it's your responsibility to do so. In exactly the same way that the Captain/Pilot in Command of a full size plane is responsible for the safety of his aircraft, you are responsible for your R/C plane. Nobody else.

In addition to the following (generalised) list of checks, always refer to the instructions of your exact plane to make sure that you're checking everything correctly. Aircraft variations aside, the common fundamental checks include...

Wing secure : rather an obvious check, this one, but having a wing not secured properly usually results in one thing shortly after take off. Methods of wing attachment will vary, the two common methods being rubber bands stretched over the wing and hooked over dowels protruding from the fuselage, or wing bolts. Whichever method your plane uses, make sure that the wing is secured correctly. If your plane has a two-piece wing and uses a wing joiner, did you remember to put it in? Pilots have forgotten!...

(Full chapter is 4 pages – [get it here](#))

The remaining chapters (well illustrated) of my e-book are:

9 : Getting airborne... Yikes!! (9 pages)

10 : Flying & trimming your plane (14 pages)

11 : Landing (9 pages)

12 : Fly some basic aerobatics (6 pages)

13 : Crashing (4 pages)

14 : R/C flying do's and don'ts (2 pages)

15 : Further progression & summary (2 pages)

16 : R/C plane glossary (8 pages)

Get the full version at:

<http://www.rc-airplane-world.com/beginners-guide-to-flying-rc-airplanes.html>

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Best Wishes,

Pete.