Introduction To Free Flight

Oxford Model Flying Club is one of the few clubs in the country that has a flying site, Port Meadow, that is suitable for free flight model aircraft. So just what is free flight and how do you get into it?

Most people's perception of model aircraft is that they are radio controlled, and that they fly under guidance from the operator. As you might guess from the name, free flight is quite the opposite; normally, the flyer has absolutely no control over the model's flight path once it's been launched.

Why do people take up free flight? For most, it's simplicity and purity that is its main attraction. Free flight models are typically small, light and slow flying. In many, perhaps the vast majority, of cases they are constructed from inexpensive materials, easy to build, and largely without the complication and expense of electronics. Nonetheless, make no mistake free flight is just as demanding, and of course rewarding as any other aspect of aeromodelling. Indeed, in some respects, it's the most demanding discipline of all.

To create a model that is capable of flying a predictable and extended flight pattern when it's under power, in the glide, and in the transition between these two flight phases is a significant technical and aerodynamic challenge; arguably, it's an art form. The performance, or otherwise, of a free flight model is almost entirely down to the skill, knowledge and ability of the flyer. Another feature of free flight models is that they are normally light and fly slowly, they don't have much inertia so very often survive a 'unplanned ground impact event', normally not the case for heavier, faster radio controlled models.

Many experienced RC flyers also enjoy free flight; indeed, some recommend that the best way for RC flyers to start is with free flight - that way, they can learn the basics of weight and balance, thrust line adjustment, control surface effects and trimming. Of course, for some people, free flight is all about nostalgia. They are flying the same models they flew in their youth when radio control was in its infancy and the cost was out of reach for their pockets'. Whatever the reason, it's worth giving free flight a try. It won't cost you much and the payback vastly exceeds the investment.

Since you have no control once it's launched, how do you know where your model will end up? Free flight models are setup (trimmed, see later) to fly in circles and as they do so, will drift downwind. You know therefore that your model will end up downwind of you, somewhere. You would also typically aim for a flight time that will keep the model in the field. The reason that Port Meadow is so good for free flight is that it's a large space and very open, no trees to reach out and grab your

model. Even so, flight times on the Meadow need to be restricted to 2 or 3 mins in anything other than a flat calm (rare) in order to stay in the Meadow.

How is the flight time restricted? We will take about power sources shortly, but the duration of the power run will limit the flight time to a large extent, BUT, there is the ever-present danger that a model will get lifted into a thermal and end up at a great height and a long way away. Flights of over 40 miles are not unknown once a model is in a thermal. In order to prevent this happening, free flight models are commonly fitted with a dethermaliser (DT) function to bring the aircraft down. The DT operates by flipping either the wing or the tail plane up to a 45-degree angle. This kills all the lift and the model descends, hopefully, with the fuselage horizontal and as though it's on a parachute, coming down slowly and without damage. The DT can either be operated by a timer set before the launch, which can be clockwork or electronic, or by radio control (RDT), in which case the model can be brought to earth at will. You will notice that suddenly, we have free flight models with radio control, however the aim of the radio is simply to terminate the flight, not control the model. There are specific RDT systems to do this to give push button DT

There are a variety of power sources for free flight models. The simplest of these is a glider; there is no power source. Gliders can be hand launched (chuck glider, or 'chuckie'), catapult launched, launched from a towline or launched from a bungee. In the case of towline launching, the towline is typically 50m long and although single person operation is possible, this is normally a two-person task, one of who has to run with the model over the uneven ground of the Meadow. Bungee's for free flight are a low power affair, typically 30m and can be operated by one person with no running involved.

Free flight very much has its origins in rubber power, but please don't think 'rubber band'. A vintage Wakefield model may be carrying 4ozs of rubber made up into 24 strands and wound to a scary torque, such a model would be at 500 feet in about 30 secs ! And please, it's always called a rubber motor, NEVER a rubber band.

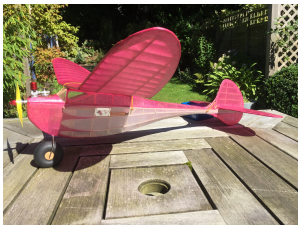
Rubber power is the simplest form of free flight power and doesn't have to be the scary option above. This can be as simple as a single loop of 1/8" rubber, wound with a low cost, plastic winder. During winding the model is either held by a helper or restrained by a 'stooge' pegged into the ground. Rubber power is simple, cheap and fun but also capable of remarkable performance.

The next ‘traditional’ form of power is a diesel engine. For free flight these generally range from about 0.3cc up to around 1.5cc. These are un-throttled and typically not silenced (but not noisy engines). The power run is short typically about 30 secs. Engines are either ‘classics’ such as the Mills 0.75cc dating back to the 1950’s or modern engines such as the Redfin range from Alex Phin. Diesel powered models have a lot of ‘atmosphere’, the combination of the sound and the smell. The downside is ending up with a model covered in oil.

Electric power gives similar performance to a diesel but without the mess and noise (but lacks the atmosphere). A typical setup is a motor, battery, electronic speed controller (ESC) and a flight profiler. The job of the flight profiler is to send commands to the ESC to set the power level and duration of the power run, often with different settings for ‘climb’ and ‘cruise’ phases of the flight. Some flight profilers include the ESC and they may also include a DT timer as well. Since the power runs are short many flights can be made without having to change the battery.

Free flight models fall into different categories: -

1) Sports Models. These are models flown simply for pleasure rather than competition and can take many forms. These range from scale models of real aircraft, through vintage designs which 'look a bit like a real aircraft', all the way to very simple models based on a stick fuselage.



2) Duration Competition Models. These are designed against a set of rules for a particular class and are optimised for duration rather than appearance. There are many different classes for the different power sources.



3) Competition Scale Models. These are built to resemble real aircraft and flown in various classes of scale competition. These vary from 'kit scale' where you lose points for too much detail through to models that require hundreds of hours of work, extensive documentation and are 'works of art' that fly. OMFC is fortunate in having many of the UK's top free flight scale modellers in its membership, who I am sure, will be happy to help.



I mentioned 'trimming earlier'. Once you let go of the model you have no further control, however although a model sometimes flies 'straight off the building board', normally the first flight is 'less than perfect' and adjustments will need to be made in order to get it to fly properly. This is the art of trimming. The basic idea is the model is first adjusted for the glide, once a good glide is achieved then the model can then be trimmed for powered flight using the thrust angle of the propeller. The glide adjustments may consist of adding packing pieces under the wing/tail plane, adding or removing nose weight, adding trim tabs, and power changes are generally small changes to the thrust line but a well trimmed model may require adjustment to a combination of all four. It's all a question of observing a flight, working out what adjustments need to be made, doing them, and then flying again. Repeat this process until it flies correctly. If that all sounds difficult, there are many experienced free flight members of the club to help.

How to get started in free flight.

Unlike radio control, there is very little in the way of 'ready to fly' models, building the model is a large part of free flight. A good start would be to visit the Vintage Model Company Website. https://www.vintagemodelcompany.com Their kits are excellent, probably the best free flight kits ever made. Yes, they do a Spitfire, but please don't start there. Their Sparrowhawk or Pilot rubber powered models would be a good place to start before moving on their scale models, staring with a high wing model such as their Cessna Bird Dog or Cessna 140.

For vintage rubber powered models that have stood the test of time then a place to start is the Ripmax range of reissued classic Keil Kraft kits, all good fliers.

If duration is your thing then start with a P30, which is an 'entry level' rubber duration and several of the club members have built the SweetP30 from Spencer Willis
https://www.freeflightsupplies.co.uk/index.php/products/kits

or for a glider the Ripmax Caprice kit. http://www.ripmax.com/Item.aspx?ItemID=A-KK1010

Once you have a few kits built then there is a wealth of plans available, start by looking at the Outerzone website. https://outerzone.co.uk

Your first few models from plans may seem a bit expensive since you have to buy everything but you very soon build up a stock of materials and my well later be able to build a model for nothing, from that stock.

Help and advice is available too at online forums like Hip Pocket Aeronautics where there is also a wealth of free plans and modelling literature

https://www.hippocketaeronautics.com

Have a crack at free flight, it's fun and can get addictive.