

Suitcase Review of Carbon Falcon

By: Jeremy Zorns (nakedsv@yahoo.com)



The Carbon Falcon, radio, charger all fit easily in my suitcase. I later found out I could even get the flight battery charger and the radio charger into the original box with the Carbon Falcon. To be safe, I later put the instruction manuals for the Carbon Falcon and the radio on top of everything. This way, if some over-zealous security man was checking my luggage, he wouldn't think I had bomb equipment or something.

Introduction

I was about to go on vacation to Poland for a couple weeks to visit with my in-laws. (My wife's 100% Polish) The idea of going overseas for two weeks without flying was too much to bear.

So I bought an EdgeRC Pocket Combat Wing. Actually, I didn't buy it, it was a bonus that came with the Overlord wing that I bought from them. Long story short, the stock GWS motor was completely inadequate. I haven't decided yet if I'm going to spend the extra \$50 or so to put a little brushless Feigao in it. Also, my Spektrum AR6000 receiver wouldn't fit in it. Since 72 MHz is not the designated RC frequency in Europe, whatever plane I opted to take would have to have room for this receiver.

So I decided to try another option: the Carbon Falcon. This would be even more ideal, (albeit more expensive) as it rolls up and does not have the somewhat fragile winglets to worry about damaging in the suitcase.

Equipment Used

Carbon Falcon ARF		\$140
Motor	Westport brushless motor (purchased at www.acesim.com)	\$30
Propeller	GWS 8x4.3 SF	\$2
Battery	2S 1000 mAh LiPo, generic (purchased locally)	\$20
Receiver	Spektrum AR6000 2.4 GHz spread spectrum (included with Spektrum DX6 transmitter)	\$60
Servos	Blue Bird standard servos, included and installed with Carbon Falcon	-
Clevises	Du-Bro 2-25 spring steel clevises	\$3
Speed Control	Castle Creations Thunderbird 9 (from www.acesim.com)	\$26
Transmitter	Spektrum DX6 (from www.horizonhobby.com)	\$200
Total		\$497

Assembly

Assembly was straightforward, thanks to the good job done by Ken during the writing of it. Not much attention is given to brushless motor options, as Ken hadn't thought of this at the time of writing. Keep that in mind, and refer to the excellent information available on his website and in his online store. It only costs about \$25 more to go brushless from the start and have a long-lasting power system.

One problem I encountered was that the clevises that mate with the torque rods were not beefy enough to handle disassembly. Mine broke the first time they were disassembled. I replaced them with Du-Bro spring steel ones and brought this to Ken's attention. Ken told me that he could not get better ones at a good price in quantity. I don't remember the part number, but I think the threads are 2-25. (they're the next smaller thread size from the 4-40 that Du-Bro offers. You'll know them when you see them)

The center of gravity is adjusted by moving the battery back and forth. (easy to do, since it is rubber-banded to the frame) Two marks are provided on the leading edge of the wing to balance it on your fingertips when you go to the field. The battery can shift around a bit during packing and unpacking, so it is a nice feature to be able to check it quickly and without any tools.

When you go to the field, all you really need is a small flathead screwdriver, to help part the head of the spring steel clevises. It's not a bad idea to carry some of the small rubber bands that are included with the Carbon Falcon, as they are easy to lose on the off chance that they fall off of their little metal hooks. Plenty of extras are provided with the ARF package.

Flight

This is a totally different experience, compared to more conventional planes. In my experience, the Carbon Falcon doesn't react as quickly to control inputs as a plane with conventional control surfaces, so keep that in mind. (especially when diving!) It took a little getting used to for me to use the entire range of the stick movement on my radio in order to fly the plane well.

The first thing that struck me about the flight of this plane was how slow it was able to fly. It can literally be flown at walking speeds. In a 5 mph wind, it can be flown at the walking speed of a 85 year-old man with a walker. To me, this is just as much of a thrill as flying by at 100 mph. You can see every detail as it floats by you, just a few feet away.

Aerobatics: I've been told that this plane will loop and roll, though I was not able to get a roll out of mine. (I did not install the speed rods, as was suggested) The loops I accomplished were kind of ugly, but this plane is not really designed for this, with all of the under-camber on the wing, and with all the gear hanging out the bottom. This plane is more fun to just putter around with. It is the slowest slow-flyer I've experienced. If you use it as such, I think you will be happy.

I've seen posts on RCGroups about how well this plane handles the wind. This has not been my experience. In my experience, it is not as controllable as a plane should be unless the winds are under 7 mph. However, it should be noted that I did not install the optional speed rods in mine. Ken tells me that they make the Carbon Falcon fly more like a regular flying wing. I haven't gotten the chance to install mine yet.

The Carbon Falcon can be flown in a pretty small space, if the winds are low. It is so slow, and with the brushless motor I used, also *very* quiet. You could crash it at full throttle into a car window and not break anything. It would probably break a house window though, so keep this in mind before you get any funny ideas.

Durability: The Carbon Falcon is also extremely lightweight, and it would be nearly impossible to damage anything that you ran it into. Another artifact of its light weight and carbon tube construction is that it is very hard to damage the plane too! This is helped even further by the fact that it flies at pretty slow speeds.

Example: My first three flights with this plane were immediate crashes. I launched it and it arced right into the ground. I assumed that it was too windy. (20 mph that day) So I came back a few days later and tried again. Same result, no matter which way I threw it. I had set it up so that it looked like the illustrations in the instruction manual. But subtle differences in the setup make for much larger differences in the way it flies. So I dialed in some up-warperon and met with much more success. I had a couple of very short flights, as I saw what I needed to do to make it fly correctly. More up warperon, some left trim, etc. After about 20 minutes of trimming it mechanically and with the radio, I was really having a ball with this little plane. After all of this "learning", it had no visible damage. No rips in the nylon, no broken parts. It is a good feeling to have a plane this durable. A classical trainer would have had about 6 broken props, at the very least. Probably a smashed-up motor mount or a bent prop shaft too. Pushers rock. (I uploaded a couple of videos of my first flights to the Electric Airplane Videos forum of RCGroups, and Ken tells me he's saved them for future use on his website)

It looks very good in the air; very non-threatening. It flies like no other plane I've had my hands on. It's much slower than any trainer I've seen and very floaty. At its top speed with my setup, it is about as fast as the slowest that I can fly my T-Hawk. (<http://www.readytoflyfun.com/thawk3chrtf.html>) Sometimes, this is just what you're looking for, right?

In Poland, the dogs were circling below it, feeling very sure that it was just a matter of time before it would come down and they could rip it to shreds. Everyone had to stop and look at it, and it was quite a thing to witness. At first, everyone thought it was a kite. After watching it for a while, they saw that it was flying whichever direction it wanted to, instead of just flying up with

the wind. Then, it came together and they went about their day. No one seemed at all threatened by it. In the photos below, you can see it flying in the town of Zakopane, Poland, with the Tatry Mountains in the background. I chose the fluorescent orange color, hoping this would make it stand out against whatever background I was flying against. Good choice! (The orange GWS propeller didn't look out of place for a change!) Those who fly flying wings will know that this is important, as they can just disappear at times. The Carbon Falcon is much easier to track, because it's shape isn't so flat, and because it's slow.

Landing: There is no better plane for hand-catching. At first, I was concerned about belly-landing this with that LiPo at the front and hanging down. However, the instructions say to wrap it in foam (some perfect stuff is included with the packing material in the box) Also, since this is a park flyer/slow flyer, landing it at 3 mph in the grass was not enough to abrade anything. After about three flights, I thought I might try a hand catch. It flies a LOT slower than my T-Hawk, which I've gotten pretty good at hand-catching. The first try, I came up a bit short and belly-landed. On the second try, I caught it, but had to run a few steps at the last second. On the third try, I was able to easily fly it right into myself and catch it with no drama, cutting the throttle as the plane was a few feet from my hands. It is pure beauty, I tell you. Spectators are very impressed when they see this!

Noise: With the brushless motor, this plane is nearly completely silent. At full throttle on a very quiet day, you can hear it until it's about 50 ft. away. At half throttle, you can only hear it for about 20 ft. With typical flying wings, the proximity of the prop to the trailing edge of the wing and the insides of the elevons make them very loud. About as loud as a quiet glow plane, even with a brushless outrunner. The Carbon Falcon is nowhere near this loud. The prop & motor are well back from the trailing edge of the wing, and there are no elevons either.

Prop Choice: The sparse instruction sheet that came with my Westport motor suggested that it could handle a 9x5HD prop on 2S LiPo power. I dug up a GWS 9x4.7SF prop, and my motor could not turn this at more than 1/3 throttle, static. The speed control just kind of started glitching. It might have been OK during flight, but I didn't try. I contacted Ken, and he pointed out to me that an HD prop and a SF prop are not the same, even though their specs might suggest they are. SF props take more torque to turn, as the mass is further out on the prop blades. I didn't have any HD props handy, so I tried a 8x4.3SF prop, with great success.

Motor Comments: My first impression of this motor is that it's a cheesy little Chinese number that was put together for pennies in a sweat shop. It has bronze bushings instead of ball bearings. Because of its design, the rotor pulls off, with only magnetism holding it on.

My second impression turned out to be the more reliable one though. When I put the can with prop-saver back on the stator, I was awestruck at how freely it turned. ...and this without ball bearings! Since this is a pusher design, there is no concern about the motor bell coming off during flight. Ken told me that he expressed concern that on a pusher design, it might come off. He spoke to the manufacturer, and was assured that it would not. Ken then tried it himself and found that it was correct. The magnetism is enough to hold it on reliably. A convenient side effect of this design is that when you're done flying and are ready to pack up, you simply pull off the motor bell with the prop still on it. Just brilliant. You can spot the prop and motor bell inside the box in one of the photos below. In flight, when I cut the motor, the prop kept spinning for quite a while. My dad tells me that oilite bushings are very common in the industry, and if they are used in applications with lower side-to-side loads, they can be very effective. The theory is that the bushing is made out of sintered bronze. You put a drop of oil in it, and it is mostly

absorbed by the bronze. But there's a thin layer of oil that comes up to the surface, and the smooth shaft rotates inside the layer of oil with very little friction.

Final impression? It simply works. It is an inexpensive and elegant way to build a small brushless motor.

Overall Impression

I'm glad I got this plane. It fills a niche that I didn't even know was there. It is a portable slow flyer that is very hard to break. It's very hard to stall at slow speeds close to the ground, unlike more conventional planes. I thought it would just be sort of a portable, and slow flying wing, but it is quite different. It flies differently than anything I've experienced. It is a great plane to have to round out your collection.

Next time you'll be leaving home for a while and will be dreading not being able to fly for a while, you might consider picking up one of these little numbers. They are super-easy to pack, easy to fly, and they don't require a lot of room or an AMA flying field.

It is kind of expensive for a plane of this size & capability, but do consider that it is unique, it is not mass-produced, (they're hand-made by Ken!) and you get personal attention from the owner of the company, if you need it. For those of us who've experienced poor customer service while seeking the lowest possible price, you will know how important this can be. It is like having good insurance. Ken is a regular at RCGroups, and is accessible by email to help you out with any problems. Although I haven't had to contact many RC companies, I highly doubt this is the case in many of the biggies. (their management is focusing on bringing in the most money, and only keeping the customers satisfied enough not to run them out of business through word-of-mouth)

It doesn't replace a trainer, a flying wing, or any slow flyer. It is a travel slow flyer and it is worth looking into if you're looking for something unique to add to your fleet. Some people have a fleet full of aerobatic mid-wing birds like Yak-54s, Edge 540s, etc. Some people have just sailplanes. Some people never really get past park flyers. Personally, I'm trying to do a bit of everything to get the most out of this hobby. I'm trying to assemble a fleet that contains one of each type of plane, to suit any mood I might be in.

Links

Acesim power gear page:

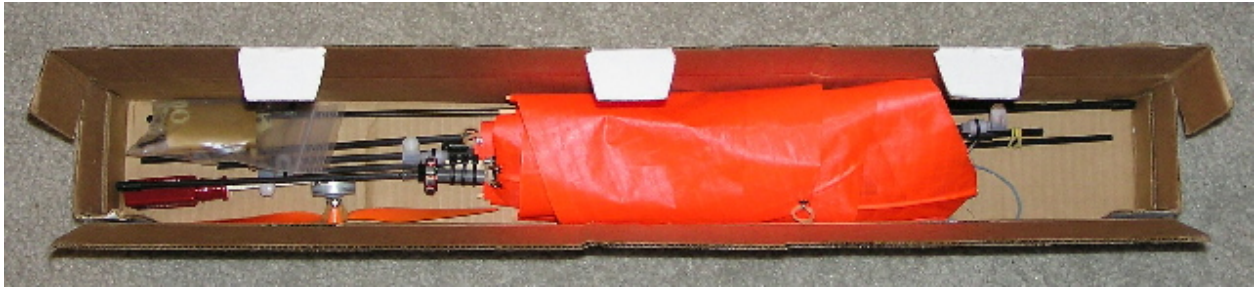
http://www.acesim.com/Merchant2/merchant.mv?Screen=CTGY&Store_Code=ASR&Category_Code=PG

Carbon Falcon page: <http://www.acesim.com/rc/p2/p2.html>

Acesim RC plane homepage: <http://www.acesim.com/rc/index.html>

Tips in getting started in RC: http://user.mc.net/~jzorns/RC_Tips.doc

Photos



Note the prop & motor bell are separate from the stator. Nice. Also note that there's still room in this original shipping box for a small charger. (Mine's a Multiplex LN5014, which just fit)



The Carbon Falcon in the Tatry Mountains of Poland. It's easy to pick out of this sub-optimal background, no?



Yours truly at the sticks. There's the shipping carton at my feet, which I use to haul it around in, until I get around to making a PVC tube/case.