



Some of today's small-field electric airplanes have a lot going for them. Not the least is that they are usually pre-built, with all radio and motor equipment installed. All are electric powered and fly very well for their size. Some fly well for *any* size airplane. But the one limiting factor is that most have only 3 control channels; rudder for turning, elevator for pitch control and throttle. Some use the throttle for pitch control instead of a separate elevator but these are not the subject here.



Photo 1

One of the better 3-channel small electric airplanes is the Wing Dragon. The Wing Dragon has taught a lot of new pilots to fly RC. It is stable, responsive and can handle winds up to about 8 mph with few difficulties. You can read about the [3-channel Wing Dragon](#) in Sport Aviator's "Ultra-Lite" Section. Just click on the preceding blue link words.

But trainers that use only the rudder to bank and turn have one major limitation and one training drawback. The limitation is that aircraft without ailerons do not handle well in cross or heavy winds. Every takeoff, and especially the landings, must to be made almost directly into the wind. It just isn't possible to hold any wing correction using just the rudder. In addition, it is very difficult to hold the windward side wingtip down when trying to takeoff from the ground (not the usual practice with these aircraft but still a good thing to do occasionally).

The training limitation is more serious. Rudder control aircraft will teach the student one very bad habit.

These aircraft will self-right out of a banked turn once the rudder is released. Therefore, the student must hold the rudder control in until the airplane completes the turn. This is not hard to do. In fact, it is easier than getting the ailerons just right in a turn.

But once the student moves on to more complex aircraft that do use ailerons for bank control, that “hold the rudder in” habit has to be immediately unlearned. Holding the aileron input in place during a turn results in the airplane’s continuing to roll onto its back and to enter the ole’ Graveyard Spiral. This is not a good situation for a newer pilot.



Photo 2

Photo 3

Although 2 and 3-channel trainers are good teaching tools, an equivalent 4-channel airplane would be even better. And that is just what Art Tech has done. Art Tech has taken the popular Wing Dragon Basic Trainer then added some wingspan and aileron control. The Wing Dragon 4 is a Ready-To-Fly ([RTF](#)), aileron-equipped aircraft that requires just one small screwdriver to assemble and no adhesives of any kind. And the screwdriver? It is used to turn the small screw that fastens the cockpit cover in place. That’s it!



Photo 3A

The Art-Tech E-Fly 4-channel transmitter is a standard 4-channel analog unit complete with trim tabs and 4-channel reversing capabilities. It uses 8 “AA” dry cells. There *seems* to be connections for a possible wall charger should the pilot want to install rechargeable Ni-Cd batteries but no charger is supplied. Since the transmitter lasts many flights on the dry cells, there is probably no need for rechargeable batteries. The transmitter does not have “buddy box” abilities but this airplane flies so slowly that teaching without it will not be a problem.

Getting the Wing Dragon 4 Ready for Its Field Trip

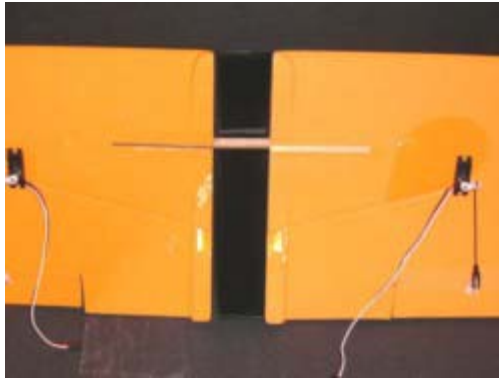


Photo 4

Even though tools or adhesives are not needed does not mean that *some* assembly is not required. Look carefully at photo 3 (click on it to enlarge if necessary). One wing half has a thick, black plastic cover adhered to the top of it. Half of this piece extends outward from the center. The other wing half has a wooden spar epoxied in place. It also extends outward by half its total length.

To assemble the wing, just slide these two halves together insuring that the main spar is positioned into the slot in the opposing wing half. Ok, wing assembly done. All that is left is a few appearance steps.



Photo 5

As photos 4 and 5 show, the dual aileron servos are already installed and connected. Dual servos are a rare quality touch in this class of airplane. Considering that this complete aircraft system has such a ridiculously low cost, \$138.00, the “fifth servo” is an indicator that this is no ordinary budget airplane.

The first appearance assembly step is to turn each servo wire on edge and insert them into the thin slot cut into the bottom of each wing half. This is most easily done after the wing is assembled. The final wing step is to install the decals which will be covered later.

It might be possible to epoxy the two wing halves together. But this extra durability step doesn't seem to be required. The thick plastic center “cap” prevents the wing halves from rotating during flight. The rubber band wing hold-down system prevents the wing halves from separating during flight. There has not been a

problem in 21 flights, some including “[snap rolls](#)” and flip-over landings in high winds.

Not gluing the wing halves together allows the pilot to separate them for more convenient storage and transportation. Having individual wing halves might make storage easier if you live in an apartment or crowded home. But you shouldn't have to break down a 46 in. wing for transportation unless you are driving a two-seat sports car. My suggestion is to keep the wing assembled if at all possible but to forget about epoxying the halves together.



Photo 6

Photo 7

Photo 6 shows that all the fuselage radio equipment is installed and connected. The twin servos connect to the rudder and elevator through thin metal control rods that are light, strong and braced for extra stiffness. The servos are mounted on a traditional plastic servo “tray” using servo screws. This system allows for easy servo replacement and keeps the servos from ever loosening in flight.



Photo 8A

There is a thin plastic “cockpit cap” that is installed over the servo area. This cover is shown in photo 7 but is reversed. The single, small screw hole should face the rear. The front of the cap tilts steeply downwards into the fuselage so that the 9.6-volt, 1000 mAh flight battery can be changed or charged without having to remove the cockpit cover. The front of the cover has two notches that should be positioned as shown in photo 8A. The fuselage “lip” is inserted into the cover slots to keep the cover from springing upwards during flight.

Secure the cover in place with the single small screw at the rear. You can now retire your screwdriver as it is

no longer needed.

Note: Before installing this screw, make sure the battery connector from the speed controller extends forward past the front of the plastic cover. This allows connecting the flight battery without having to remove the cockpit cover.



Photo 8

The "kit" (it is hard to call an RTF airplane that requires 11 minutes to completely assemble, minus decals, a kit) includes a small pilot bust, with double sided tape already attached. When you position the pilot bust in place, make sure that the flight battery can easily be installed or removed. For my airplane, positioning the back of the pilot bust 1/2 inch from the cockpit rear worked well.

Installing the Rear Control Surfaces

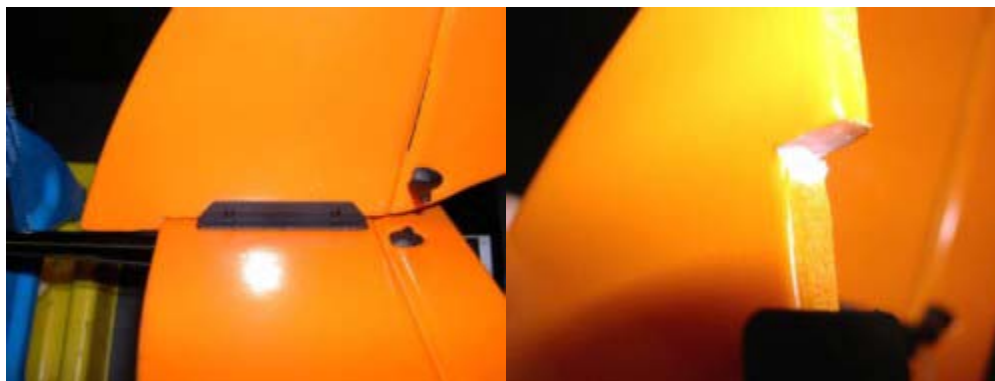


Photo 9

Photo 10

On the bottom of the vertical fin/rudder assembly, there is a reinforced nylon mounting piece already installed. The vertical fin assembly fits over the horizontal stabilizer assembly as shown in photo 9. In theory, the Wind Dragon 4 does not need any tools except for the cockpit cover. But test fit the vertical fin in place over the stabilizer before trying to assemble everything. It should fit flush against the stabilizer.

On this aircraft, the forward slot on the vertical fin needed to be relieved by about 1/8 in. as shown in photo 10, for a flush fit. Use a sharp hobby razor knife for this. This operation required about 45 seconds to test and 30 seconds to fix.



Photo 11

Photo 12

In photo 9, the rudder pushrod was placed under the stabilizer. This was done in order to allow the small notch cut in the vertical fin's bottom to show in the photograph. But in reality, make sure that both control pushrods are above the horizontal stabilizer (photo 11) when positioning it in place over the fuselage tail boom. Photo 12 shows the actual real-world top assembly from the rudder control rod side.



Photo 13

Photo 14

But there is some work to do underneath to secure everything in place. Photo 11 shows how the two thumb screws used to attach the fin/stabilizer assembly to the fuselage boom pass through the two loops in the tail wheel mounting wire. Install both screws before tightening in place (photo 14). Notice in photo 13 the round hollow aligning tube and its matching hole in the stabilizer bottom. Remember that the elevator control horn goes on the top side. The final assembly should look like photo 14.



Photo 15



Photo 16

After assembling the rear end and tightening the two thumb screws, it should look like photo 15. Carefully attach each control rod to its respective control horn. Use the middle hole for best results. Using the middle hole in the control horn allows enough control movement for aerobatics and very slow flight without making the airplane too sensitive.

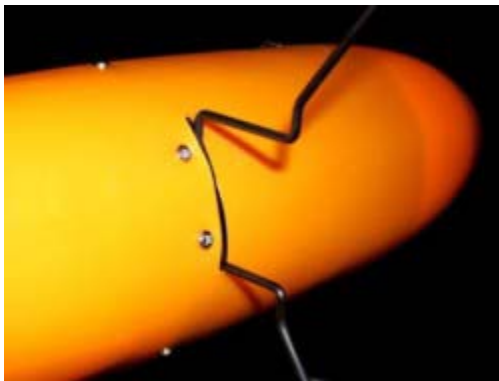


Photo 17



Photo 18

The main landing gear assembly comes as one piece, including the installed wheel pants. Even this installation does not require tools. Simply insert the landing gear into the fuselage slot (photo 17). Then push into place (photo 18). There is an internal locking mechanism inside the fuselage that holds the gear in place. However the gear can be easily removed by gently squeezing the two legs together at the fuselage and sliding the assembly out. The gear stayed firmly in place and didn't bend even during harder than ideal landings.



Photo 19

The final assembly step is to fish the two aileron servo wires out of the fuselage as shown. I used a long surgical clamp to do this but you can just turn the fuselage upside and give it a gentle shake. Inside, these two aileron servo leads are already connected to the receiver. The connectors are constructed so that each lead fits only its respective servo.

Adding a Little Glamour

The Wind Dragon 4's wing is made from a light, but very strong *orange* foam. Whatever this foam is, it is difficult to dent, even on purpose. The vertical fin and horizontal stabilizer are also made from foam but covered with an *orange* semi-gloss coating. Both are also sturdy, light and just about dent proof (within reason). The fuselage is made from a fiberglass boom and a very sturdy, molded *orange* plastic of some type.

Did I mention that the wings, fuselage and tail surfaces were all orange? I did? OK, but they are all *orange*. It is an attractive orange but *all* orange. The black wing center section and the black fuselage boom help relieve the orange overcast some, but these pieces are all black. Some color is needed somewhere on this airplane.



Photo 20

Photo 21

Fortunately Art Tech has supplied some very colorful decals for this airplane. Decals work better on electric aircraft because there is no fuel residue that can gradually loosen them as happens with glow-powered aircraft. At first the colors seemed strange. I am not much of a color designer, my wife picks out my ties, but green, red and light blue didn't seem to be good color choices to accent an all orange airplane. But these

colors have internal highlights that lighten and change their coloring effects while enhancing their appearance. The final result is amazingly pleasing to the eye.

There are two ways to properly apply “Sticky-back” decals like the Wing Dragon 4’s. The first uses the “Wet Water” concept that allows sliding the sticky decals around until the position is just right. This method is covered in detail in the [Liberty Review article](#). The second method is not as exact but tends to work better on non-smooth surfaces like this foam wing. It helps if the decals being applied are not overly large, like the ones on this aircraft.

The idea is to mark on the wing where the two decal ends will go. Then gently apply the decal end, the end only, to the first mark. Slowly lower the rest of the decal in place while gently smoothing it out (photo 20). Make the smoothing strokes at 45 degree angles just as if you were applying wallcovering. Keep the finishing mark in mind and aim the decal to it. The final result should be a wrinkle free decal that looks great (photo 21).



Photo 22

The decals have been pre-trimmed which speeds the process. You can apply all the decals or only some. I choose to limit the number of decals to the decorative ones and the airplane’s name on the left upper wing and the vertical fin. I did put “Hobby Lobby” on the fuselage since that is where the airplane system is available.



Photo 23

The 21 minutes applying the decals turned the orange bomber into a very attractive sport airplane. The top side has an attractive look while there is no lack of visibility gazing at that bright orange from below. The

boom provides a different look than most airplanes this size. The Wing Dragon 4 is definitely not a run-of-the-mill looking aircraft. Its appearance is unique,

Getting Ready

Although the Wing Dragon 4 is truly an RTF aircraft, it is a good idea to do all the pre-flight checks outlined in the Sport Aviator article: "[Ready To Fly...Maybe?](#)". There should be no need to laterally balance the airplane since the wing is made from constant density foam and there is no muffler hanging out on side. The airplane is about as laterally balanced a design as possible. If you still want to check it though, be very careful not to "saw" the nylon fishing line through the top rudder hinge. Do not rub the line back and forth while balancing.

The propeller comes pre-installed and was tight. It is a tight press fit so no extra tightening is required. However, keep clear of the propeller arc when doing the first few start-ups just in case.

The brushed motor, about a 380 size, draws a maximum of 90 watts at 10.85 amps using the supplied 8-cell, 9.6-volt battery. The battery's capacity is 1000 mAh. At its 26 oz. weight, this means the power loading is 55.4 watts per pound. I thought this was a little low, even for a basic trainer. Flight tests however, proved my thoughts wrong.

At full throttle, the 1000 mAh battery should last only about 6 minutes. But real-world flight times proved to be closer to 10 minutes. The Wing Dragon 4 doesn't need more than slightly less than half throttle to cruise at a good training speed. But we are rushing the flight report here, so let's get back into order.

The 46.5 in. span wing has 341 sq. in. of lifting surface. The wing loading is 10.97 oz. per sq. ft. That is extremely low for a 4-channel Basic Trainer. Most ".25 size" trainers, the Wing Dragon is about the same size as the .25 Eaglet, have wing loadings closer to 16-20 oz. per sq. ft. Based on this number, the Wing Dragon 4 should fly very light on the wings resulting in slow landing approach speeds. The light wing loading is one reason that this aircraft does not need excessive throttle to maintain level flight. Its clean airframe design is another.



Photo 24

Flight Testing

It was a cold, windy day at the field. The wind was around 12 mph but gusting higher. The temperature hovered around 40 degrees F but felt colder. There wasn't much sun as the clouds covered everything. But the Wind Dragon 4 stood its ground at least when pointed into the wind.



Photo 25

Photo 26

Normally, no sane person would test fly a “park flyer” even a large one such as the Wing Dragon 4, in this kind of wind. But this aircraft has two advantages most Park Flyers do not have. First, its profile is very streamlined. Photo 25 shows that there is very little frontal area meaning that wind “penetration” is good. The airplane seems to react well to gusts and sudden wind changes. My *opinion* is that the extra streamlining and the rear mounted “pusher propeller” account for much of this wind handling ability. Pusher propellers are a bit more efficient than the more common tractor type.

Even more important is that 4th channel; the ailerons. Having ailerons not only makes the aircraft roll better, fly with more control authority and able to perform more aerobatic maneuvers but ailerons also make it possible to [slip](#) and [skid](#) into crosswinds during final approach and landing. Ailerons offer the pilot extra control options and the ability to more accurately “place” the aircraft in the sky than does rudder-only steering control. I would never have attempted these first flights in this wind for example, with the 3-channel Wind Dragon.

Speaking of photo 25 yes, I admit it was I who put the windshield decal on off-center. The red pilot hasn’t complained yet so off-center it will stay since trying to fix it now will only ruin it. As photo 26 shows, the Wind Dragon 4 is really attractive and has a very different appearance from most aircraft in its class.



Photo 27

The Wind Dragon 4 will take off from the ground, but only if the ground isn’t made from grass. The wheels are too small to reach above anything except golf-green style grass and the wheel pants get caught in the tufts. It *will* take off from pavement. Actually, that takeoff was from a tennis court as that was the only “pavement” around the field across from my house. But the airplane cleared the chain link fence with ease.

Try that with the usual Park Flyer.

Photo 27 shows Sport Aviator photographer Bob Karasiewicz getting ready to launch the airplane on its maiden flight. You can see that the wind is really blowing hard and the temperature is cold. It is possible that Bob was re-thinking his Sport Aviator connections at that point! Fortunately both Bob and Frank Costello, the other Sport Aviator photographer, have remained at their posts since the magazine would be nearly impossible to produce without their expertise and help.

There is no motor “safety” on this airplane. So make sure the transmitter is turned on and the throttle stick and trim are both in the low position before connecting the motor battery. Be sure the aircraft is firmly held in place by either an assistant or a tether. Stay clear of the propeller arc when connecting the battery.

With everything ready to go, except Bob who was hiding in the warm field house, we got set to become airborne. After dragging him out of the warm house, Bob gave the Wind Dragon 4 a good launch and the airplane headed out into the stiff headwind. Handling was exceptional and a little better than a .40-size Basic Trainer would do. Gust response was minimal despite the very light wing loading.



Photo 28

As mentioned, there was some concern about the power loading. The Wind Dragon 4 is definitely a “wing flyer” meaning that climbs are made by increasing the wing’s lift rather than by standing the airplane on its tail and overpowering the climb. However, this aircraft’s climbing ability more closely resembled a .25 glow trainer than a small electric-powered trainer. Climb rate was good, probably around 5-600 feet per minute, maybe more.



Photo 29

During the climb, the airplane maintained its airspeed and showed no tendency to wander around because of lack of power. Even the strong wind didn't seem to bother it much. When flying through the gusts, the airplane went where it was told to go and did what it was told to do.



Photo 30

The Wind Dragon 4 performed some fairly respectable rolls. While not truly axial, only roughly mid-wing aircraft can do that, the rolls did not send the airplane off-line in a different direction. Roll rate was around one roll per 1.5 seconds. There was enough power and airspeed to do about a 40 ft. vertical climb to a [stall turn](#). The stall turn required opposite aileron to keep the wings in place. Otherwise, the airplane tried to roll with the rudder input. This is called "roll coupling" and is a common trait of all Basic Trainers.

The best stall turns were done when the airplane still had some upward movement and at medium power settings. Waiting until the airplane had completely stopped its vertical climb most often resulted in a "flop" meaning the nose dropped straight ahead instead of rotating 180 degrees. It should be noted at this point that many small Park Flyer trainers can't even make a vertical climb of any size, let alone one 40 feet straight up. So much for the worries about a low power loading.



Photo 31

The Wind Dragon 4 will loop from level flight. The loops are about 25 ft. in diameter. They are controllable and it is easy to maintain the airplane's track in consecutive loops. However inverted flight is not possible. But then very few, if any, small Park Flyer Basic Trainers can fly inverted.



Photo 32

The Wind Dragon 4 has aerobatic capabilities 3-channel Trainers do not. But how is it as a trainer? Training airspeed seems around 25-30 mph. Because this aircraft is equipped with ailerons, the student will have little trouble keeping it pointed the correct way. There also will not be any need to “transition” to an aileron airplane after soloing. Un-learning that “hold the rudder in” turning habit 3-channel trainers instill in a new pilot can be more difficult than it might at first seem. That is not a problem with the Wind Dragon 4.

There is little drop in the turns if the bank angles are kept under about 30 degrees. Banks steeper than 45 degrees require considerable elevator to keep the aircraft level. Since it is such a “clean” airplane, the Wind Dragon 4 will gain some speed if the nose is allowed to drop in the steep turn. However, the resultant “ballooning” tendency, (the nose pops upwards as soon as the wings are leveled), is not as severe as it would be on larger glow-powered trainers.

The cause of this is probably, note “probably” here, that the aircraft first loses airspeed in the steep turn before regaining it in the dive. Therefore, less *net* airspeed is gained and the ballooning tendency is minimal.

Landing airspeeds are around 17-20 mph. Touchdown airspeeds appear less than 10 mph. That light wing loading makes for a very slow approach while still keeping the airplane controllable. The pilot has excess thinking time and can easily stay ahead of the airplane. On grass, there is no rollout but then landing speeds are so low that the airplane does not even offer to turn over. At 26 oz and 10 mph, there just isn’t a lot of momentum to cause landing difficulties.

Summary

Overall, any student pilot will have as easy time learning to fly with this aircraft. Any wing or tail damage is easy to fix using 5 minute epoxy. The fuselage is so tough and strong that the only way to damage it is to totally destroy the airplane. There is some question whether even a full-power, vertical dive into the ground will break this strong fuselage.

Handling is excellent; on a par with .40 glow-powered aircraft. 8-10 minute flight times are reasonable for learning to fly. And that 4th channel allows the pilot to learn some aerobatic maneuvers after soloing.

Considering its low \$138 price tag and its considerable abilities, this airplane is a really good buy. Learn more about it at: <http://www.hobby-lobby.com/wingdragon4.htm>