

EXTRA 300EXP v2

Electric ARF



***EX*TREME FLIGHT** 

Copyright Extreme Flight 2020

Greetings and congratulations on your purchase of the version 2 of the Extreme Flight RC Extra 300EXP ARF. Loosely based on our favorite variant of the Extra, the mid-wing Extra 300, we have taken numerous liberties with this design to produce an aircraft that is both unique in appearance and flight ability. The designation 300EXP does not belong to a full scale Extra, but stands for Experimental Progressive. This name was chosen due to the fact that from its inception the Extra 300EXP was developed as a test bed for several new forward thinking design and aerodynamic concepts. This new V2 version further refines the original concept with additional use of composites resulting in a stiffer, stronger airframe and a slight reduction in weight.

The Extra 300EXP incorporates carbon fiber and G10 composites into the structure of the airframe, resulting in a lightweight, yet twist free structure capable of handling extreme aerodynamic loads. Carbon and G10 are used in high stress areas such as motor box support, landing gear mounting structure and fuselage longerons to provide enormous strength and durability. A true piece of carbon fiber art, the landing gear is airfoiled and has just enough "give" to cushion those not so perfect landings. The removable wing panels are mounted on a carbon fiber wing tube and are fastened to the fuselage with nylon thumbscrews. The large canopy (which is retained by a spring loaded hatch latch) has been moved forward to place the tallest portion of the aircraft at the center of gravity, resulting in the best knife edge performance of any aircraft we've flown to date. All control surfaces are pushrod driven with short linkages and use ball links for slop free actuation with no binding. Optional Side Force Generators are included and add to the already generous side area, increasing yaw axis authority and adding stability in all angles of sideslip. Expertly painted fiberglass cowl and wheel pants and 2 gorgeous high visibility Ultracote color schemes add the finishing touches and make this an airplane that you will be proud to show up at the flying field with. The combination of these unique elements add up to an aircraft that pushes the boundaries of modern aerobatic flight.

If repairs become necessary, the Ultracote colors used on the Extra 300EXP are as follows:

**Yellow/Red/Blue/Silver color scheme: Cub Yellow, Midnight Blue, Silver, True Red
Orange/White/Blue color scheme: Orange, White, Midnight Blue, Sky Blue, Silver**

Extreme Flight R/C reserves the right to alter the assembly process at any time. While we do our best to update the manuals, sometimes there are minor changes in the process of the build. If you have any questions regarding assembly please contact us before moving forward.

Tips for Success:

- 1. Before starting assembly, take a few minutes to read the entire instruction manual to familiarize yourself with the assembly process.**
- 2. Please take a few minutes and go over all the seams on the aircraft with a covering iron on a medium heat setting.**
- 3. Use a fresh bottle of thin CA with a fine glue tip when attaching the CA hinges. This will ensure that the proper amount of CA wicks into the hinge and surrounding balsa wood and creates a proper bond between the wood and hinges. We are big fans of the Mercury line of adhesives as well as the glue tips provided by them.**
- 4. Apply a couple drops of CA to high stress areas such as anti-rotation pins, landing gear mounts, servo trays and motor box support mounts.**
- 5. All of the G10 control horns are the same with the exception of the elevator horn. Its base has been shortened to fit the depth of the elevator.**
- 6. When applying decals, first clean the area where the decal will be applied with alcohol. Mist the area lightly with Rapid Tac or Windex before applying the decal which will allow you to properly position it, then use a rubber squeegee to push all of the liquid from under the decal. This will result in very few air pockets trapped under the decal.**
- 7. Take the time to properly balance and trim your aircraft and set up rates and exponential values. Your flying experience will be greatly enhanced by doing this.**

Items needed for completion

-masking tape

-Thin and medium CA. We highly recommend Mercury M5T thin and M100XF medium formulas as well as the Mercury glue tips.

-Blue Loctite.

-Electric drill with an assortment of small drill bits.

-Small flat head and Phillips head screw drivers.

-Standard and needle nose pliers.

-Metric balldriver or allen key set.

-4 sub micro metal geared servos. All flight testing was performed with Hitec HS-70MG

-Torque 2814T/820 Brushless Outrunner motor.

-Airboss Elite 45 Amp ESC.

-4S 2100-2700 mah LiPo battery.

-Falcon or APC 12x6 E prop (NOT the slow fly version!).

-52mm Extreme Flight spinner.

-2 18" extensions for the 2 rear servos and 2 6" extensions to go between the receiver and the aileron servo leads. We recommend the Extreme Flight 28 AWG servo extensions to save weight.

-Adhesive backed Velcro and Velcro strap for battery retention.

Please note: The Extreme Flight 4 in 1 airplane stand is invaluable when assembling our aircraft, from the 48" size models right up to our 50cc models. I can't imagine assembling all of the aircraft I do without the aid of this inexpensive yet handy tool!

[https://extremeflightrc.com/4-in-1-Airplane-Stand p 1892.html](https://extremeflightrc.com/4-in-1-Airplane-Stand_p_1892.html)

1. Gather the components for the landing gear assembly.



2. Insert the threaded portion of the axle into the carbon fiber landing gear. Slide a washer onto the axle followed by a nylon insert lock nut. Do not tighten yet.



3. Slide a wheel onto one of the axles and secure with a wheel collar. For best results file a small flat spot on the axle for the wheel collar's set screw to seat against. Repeat the process for the other wheel. Be sure to place a drop of blue thread lock on the setscrew.



4. Slide the wheel pant into position. Tighten the nut on the axle so that the wheel pant is pinched between the axle and the landing gear leg. The recessed area of the wheel pant will align with the gear and prevent it from rotating. Repeat for the other wheel pant.



5. Mount the landing gear assembly to the fuselage using the provided 3mm socket head cap bolts and washers. Make sure to apply a drop of blue thread lock compound to the bolts.



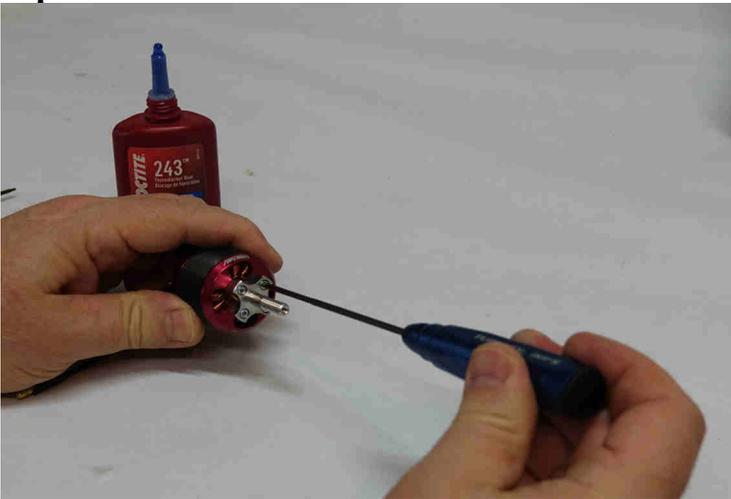
6. Next lets assemble the Torque 2814/820 and install it and the ESC onto the fuselage.



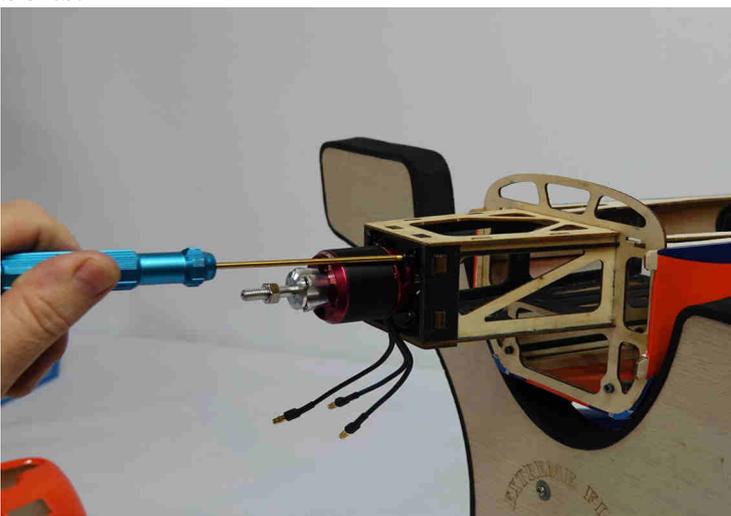
7. Secure the radial mount to the motor with the 4 supplied Phillips taper head screws.



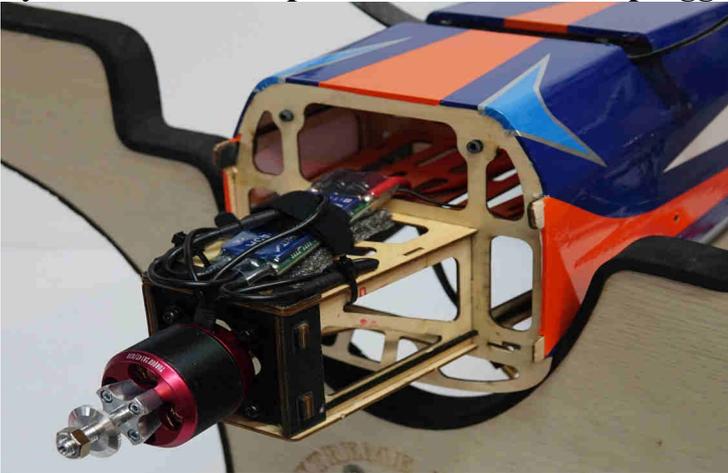
8. Secure the prop adapter to the other side of the motor with the supplied socket head cap bolts. Remember to use blue thread lock compound on all bolts!



9. Attach the motor to the front of the motor box with the supplied 3mm socket head cap bolts.



10. Mount the ESC to the bottom of the motor box with Velcro or a nylon cable tie. I like to place a piece of shock absorbing foam under the ESC to protect the components from vibration. Now is a good time to verify proper motor rotation direction. Plug the ESC lead into the throttle port on your receiver and attach a battery to the ESC. Arm the system (without a propeller attached) and verify direction. If the motor rotates in reverse swap any two motor wires and verify rotation direction. Secure the motor wires using nylon cable ties to prevent them from unplugging or getting chafed.



11. For quick, easy and accurate mounting of the cowl we recommend the following method. Tear 4 short pieces of masking tape from a roll. Place each piece of tape on the side of the fuselage so that each piece corresponds with one of the 4 cowl mounting tabs. Use a fine tipped marker to mark the location of the center of each mounting tab. Roll the tape back and slide the cowl into position. Install an Extreme Flight 52mm spinner onto the motor shaft for reference and once satisfied with the cowl position roll the tape back into place and secure the cowl. Use a 1/16" drill bit to drill a hole at the location of the dot on each piece of tape. Remove the tape and secure the cowl with 4 of the included small wood screws with integrated washers. Very simple!

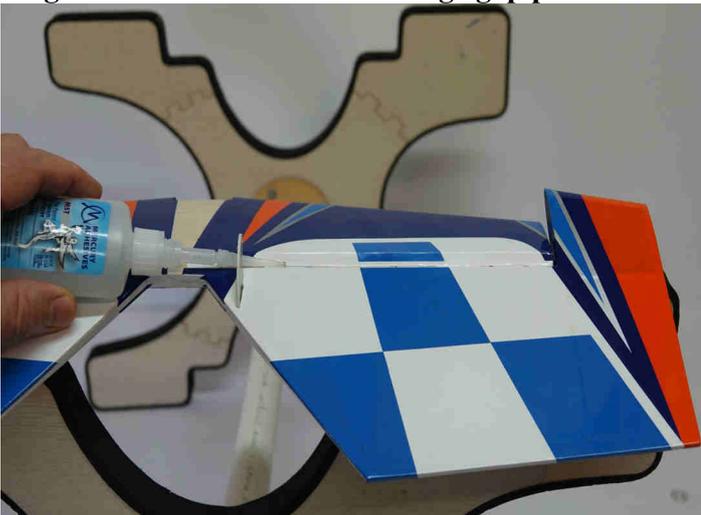




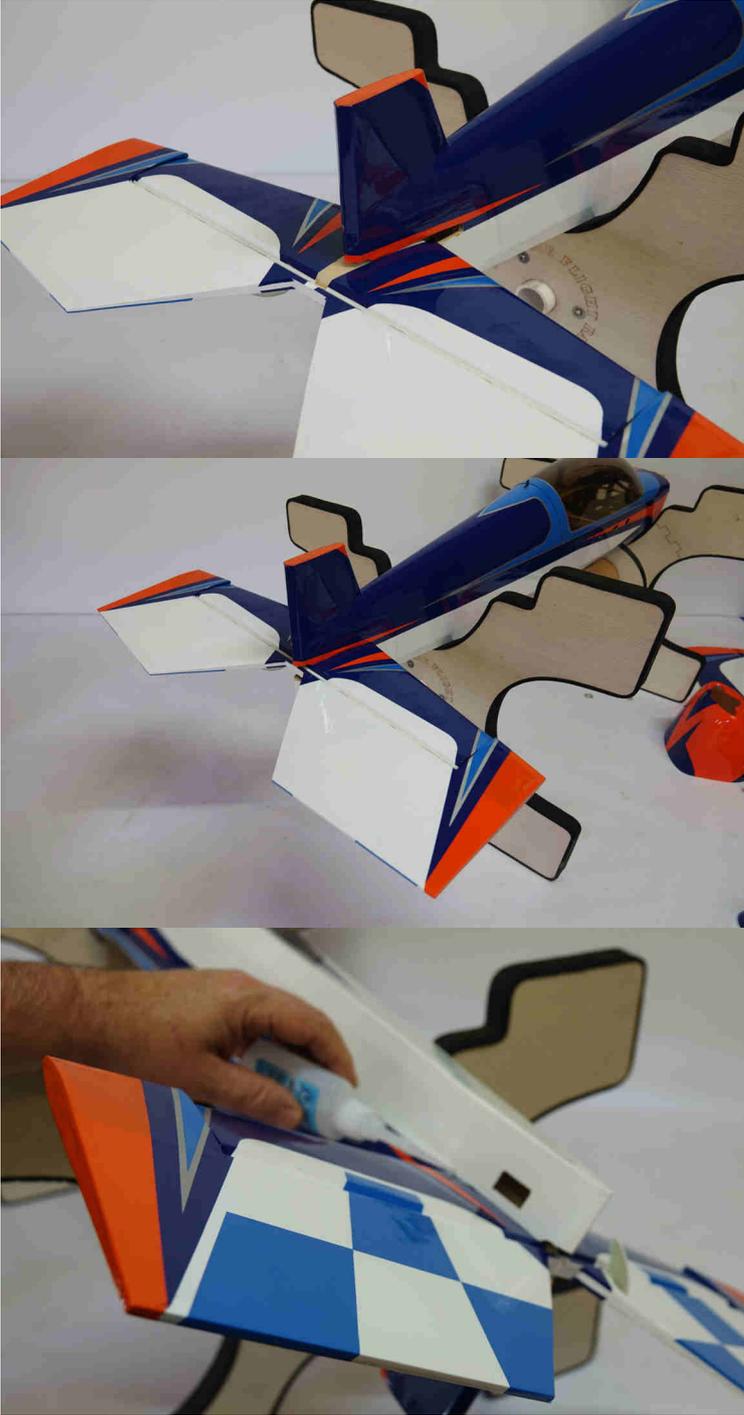
12. Locate the horizontal stabilizer/elevator assembly along with the elevator control horn. Verify the fit of the control horn and make sure it does not protrude through the top of the surface. Trim if necessary. Once satisfied scuff the portion of the horn that will be inserted into the elevator with sandpaper. Glue the horn into position in the precut slot with medium CA.



13. Center the hinges in their slots and secure with a couple drops of fresh thin CA on each side of the hinge. Strive for the smallest hinge gap possible.



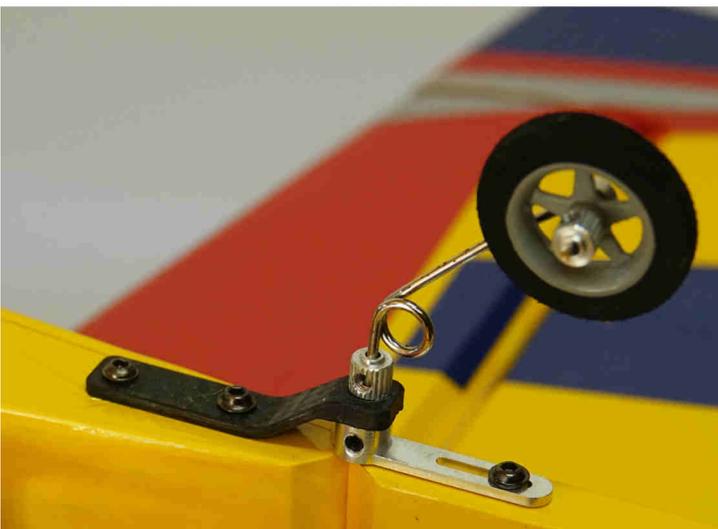
14. Insert the stab into the rear of the fuselage and push as far forward as possible. Slide the main wing tube into its sleeve to check alignment with the stab. Measure side to side as well. When satisfied secure the stab assembly to the fuselage with thin and medium CA.



15. Scuff the rudder horn with sandpaper and glue into the pre-cut slot on the lower portion of the rudder with medium CA. Slide the rudder onto the hinges and secure to the fuselage with thin CA.



16. Secure the tailwheel assembly to the bottom rear of the fuselage with the provided wood screws and affix the tiller arm to the bottom of the rudder with a wood screw.



17. Attach an 18" Extreme Flight 28AWG servo extension to the elevator servo lead and secure with heat shrink tubing or an Extreme Flight servo extension lock. Install the elevator servo into its slot and assemble the linkage as shown. There is a G10 servo arm included in the hardware package, used to achieve 3D throws in excess of 50 degrees. Attach this arm to the stock servo arm with a 2mm screw and nut as shown. Use your power drill to help thread the ball links onto the pushrod.



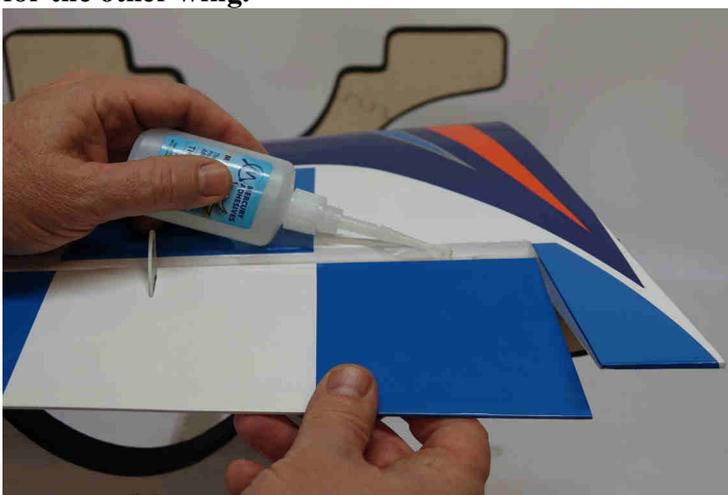
18. Attach an 18" Extreme Flight 28AWG servo extension to the elevator servo lead and secure with heat shrink tubing or an Extreme Flight servo extension lock. Install the rudder servo and assemble the linkage as shown. The stock servo arm provides full rudder deflection.



19. Scuff the aileron control horn and glue into the pre-cut slot with medium CA.



20. Center the hinges in their slots and secure the aileron to the wing with thin CA. Repeat this process for the other wing.

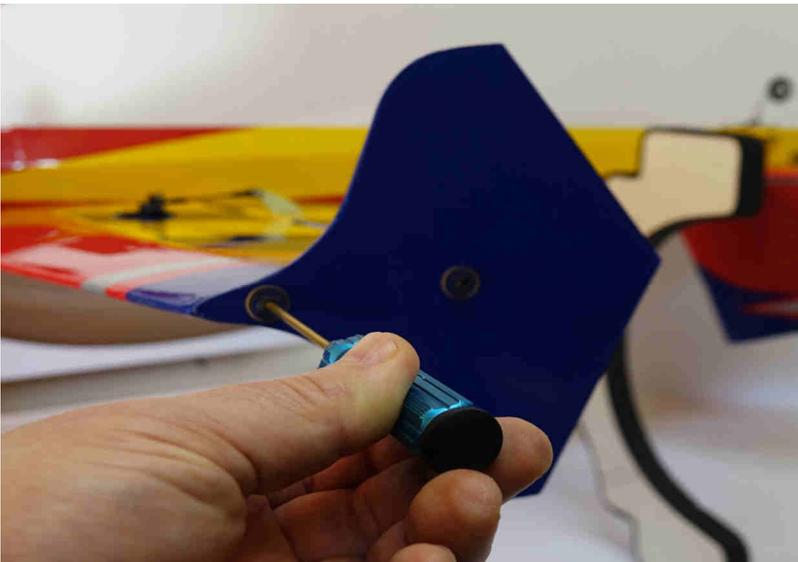


21. Insert the aileron servo into position and secure with the manufacturer supplied servo screws or Extreme Flight socket head servo screws. Assemble the aileron linkage as shown. Please note that I have installed the linkage on the bottom side of the servo arm. This reduces the chance of binding and allows full deflection with the stock servo arm.



22. Place a strip of Velcro onto the battery tray and onto your battery and use a Velcro strap around the battery and tray to prevent the battery from being ejected during high G maneuvers. Mount your receiver on the portion of the battery tray that extends behind the wing tube with Velcro.

23. If using the included Side Force Generators now is the time to mount them. Each SFG mounts using 2 3mm bolts and 2 clear plastic washers. There are 2 clear plastic spacers that go between the wing tip and the SFGs.



24. Insert the carbon fiber wing tube into its sleeve in the fuselage and slide the wings into position. Secure each wing by inserting a nylon wing bolt through the fuselage side and into the pre-installed blind nut in each wing root.



Set-up and flying tips

Start by balancing your aircraft on the center of the carbon fiber wing tube. There is plenty of room on the battery tray to move your battery to achieve this CG location. This is a safe place to start and depending on your flying style you can adjust the position of the battery to alter the CG to accommodate your flying style. For this type of aircraft where I am going to predominantly fly aggressive 3D I typically set the airplane up with a neutral CG, meaning that when the aircraft is flown inverted straight and level it requires no down elevator to maintain altitude. If your flying style leans more toward precision aerobatics then I recommend setting your CG using the 45 degree line test. Fly the aircraft from left to right or right to left, whichever direction you are more comfortable with at 3/4 to full throttle. Pull the aircraft to a 45 degree up line and establish this line and immediately roll the aircraft inverted. Establish this line and let go of the elevator stick. Ideally the aircraft will continue to track on that 45 degree line for several hundred feet before slowly starting to level off. Adjust the position of your battery to achieve this flight condition. Once satisfied with the location of your CG scribe a mark on the battery tray so that you can position the battery in the same location each flight and achieve the same feel and flight characteristics each flight.

I also highly recommend taking the time to properly set up your rates and exponential settings. Setting up low rates for precision maneuvers and high rates for aggressive aerobatics and 3D flight will allow you to experience the best attributes of the Extra 300EXP or any aircraft for that matter. The included elevator servo arm will allow for close to 80 degrees of throw! While this is great for really aggressive tumbling maneuvers, positive and negative waterfalls and straight down dropping elevators, it can wreak havoc on stable harriers, especially if you are just learning the maneuver. If your radio will allow I suggest setting up 3 elevator rates or a flight condition that will allow you a rate for precision flying, another for harriers and the majority of 3D maneuvers and a final rate with as much travel as you can get for the crazy tumbles and flips.

Here are some suggested rates to get started with. These are the rates and exponential values I feel comfortable with. They may feel awkward to you and if so please adjust to your taste.

Elevator: Low rate-8-10 degrees; 15-20% Exponential

3D rate-45-50 degrees; 60-65% Exponential

Insane tumble rate: As much as possible! 65-70% Exponential

Rudder: Low rate-20 degrees; 45-50% Exponential

3D rate- As much as possible; 80-90% Exponential

Aileron: Low rate-15-20 degrees; 40-45% Exponential

3D rate- As much as possible; 70-75% Exponential

Again, these are my preferences, adjust to suit your flying style and preferred feel.

The Extra 300 EXP is capable of performing the full range of known 3D and precision maneuvers. It is also capable of performing all kinds of crazy aggressive maneuvers that have yet to be named. A great deal of fun and excitement can be had by just gaining some speed and pushing the sticks into new positions and seeing what happens! We've been able to coax all kind of crazy gyroscopic maneuvers out of this airframe. One of my favorites is to gain some speed and while on 3D rates and the "insane" elevator rate simultaneously chop the throttle while giving positive snap inputs (full up, full left aileron, full left rudder). Typically the EXP will perform 3 aggressive positive tumbles flipping over the wing tube before it runs of out inertia. Experiment with different inputs and vary the speed of your entry and see what happens. We can't wait to hear what you come up with! Be sure to get it on video! Another strong attribute of the EXP is its knife edge capability. The forward canopy placement gives the aircraft very stable KE performance and when coupled with the SFGs the rudder authority is amazing. Huge round KE loops with backside recovery just above idle are the norm for the EXP. Super slow high alpha KE passes are no problem.

The included SFGs can also act as "training wheels" when learning the harrier maneuver. They can help to stabilize the aircraft in high alpha flight and reduce pilot workload which certainly helps when you are learning a new maneuver.

Another neat set-up to try is to mix the ailerons to act as spoilerons which move in conjunction with your elevator. This mix commands both ailerons to raise as the elevator raises. I typically use this mix at 100% and put it on a switch so I can turn it on when needed and inhibit it when not needed. This mix allows the most straight down dropping elevators you will ever encounter, insane walls that gain no altitude where the tail of the aircraft is basically thrown under the fuselage and the tightest KE spins I've ever seen. This mix is also another good training tool for learning the harrier maneuver and by experimenting with the amount of spoileron to elevator mix you can actually determine the angle of attack that the EXP will harrier in. The best advice I can offer is to experiment, burn through lots of battery packs and above all have fun! You are in possession of a completely capable airframe whose flying abilities are only limited by your imagination. We have had a blast during the development and testing stages of this aircraft and I sincerely hope the Extra 300EXP provides you with as much joy and excitement as it has for me. See ya at the flying field!