Assembly manual

Thank you for buying aeromusical plane *Arrow V.5* from *Donatas Design*!

Arrow V.5 **evolved from famous 4D trainer with variable pitch propeller placed inside the fuselage. This plane is the best choice for those who want to learn 3D or 4D flying.**

This plane kit is milled in order to save some plane's weight (about 9 grams). This is very important factor while competing in F3P competitions.

I recommend to use 18,5g AXI2203/RACE motor and 2s light lypo battery for *Arrow V.5* if you plan to fly indoor. For outdoor flights AXI 2204/54 with 3s light lypo are recommended.

NOTE! Additional reinforcement to the airframe will be needed if you decide to use more powerfull motor.

This kit includes all items necessary to finish the kit: depron parts, carbon rods, flat carbon, hi quality fiberglass hardware set, motor mount, Z ends for servo attachment, velcro tape for battery fixation and pull-pull line.

Equipment selection

Motor: **AXI2203/Race (for indoor flying, weight - 18,5g)**
AXI2203/40 (for indoor VPP flying, when model is extremely light)
AXI 2204/54 (for outdoor flying in light wind, weight - 25,9g)
AXI 2204/54 EVP (VPP flying, motor weight - 25,9g)

ESC: **Competition option Castle Creation Phoenix 10a, budget version CC Thunderbird 9.**

Battery: **Desire Power V8, 35C 300mah, 2S/7,4V, weight 16g. (Light indoor)**
Desire Power V8, 35C 380mah, 2S/7,4V, weight 22g. (Powerful indoor)
Desire Power V8, 35C 380mah, 3S/11.1V, weight 30g. (Powerful outdoor or VPP)

Servos: **Dig. JR 290G single servo for elevator and rudder, 2 servos can be used on ailerons.**
Dig. JR 188 single servo for elevator or rudder, 2 servos can be used on ailerons.
Hitec 65hb single servo on ailerons and rudder.

Radio: **At least 4 channel programmable radio with minimum programming of exponential. I would recommend more advanced radio like JR 9 or JR11 that have travel adjustment, dual rates, trim steps, digital trimmers, mixes, and other useful functions. These will help you to setup your plane faster and to seek for the best results.**

Receiver **: As light as possible! For e.g., I use and have no complaints about:**
Spektrum 2,4ghz Ar6300 2g.
Duplex 2.4ghz R6Gindoor 3.6g

Donatas Design F3P hardware set.

Elevator control horn for pull push.

Servo arms for elevator and (double servo) ailerons.

Elevator reinforcement plates.

Aileron offset servo arm.

Aileron horns

Motormount for AXI 2203/52

Elevator and rudder servo arms for pull pull.

Wing carbon support center.

Rudder reinforcement plates for pull pull.

Wheel pants reinforcement plates.

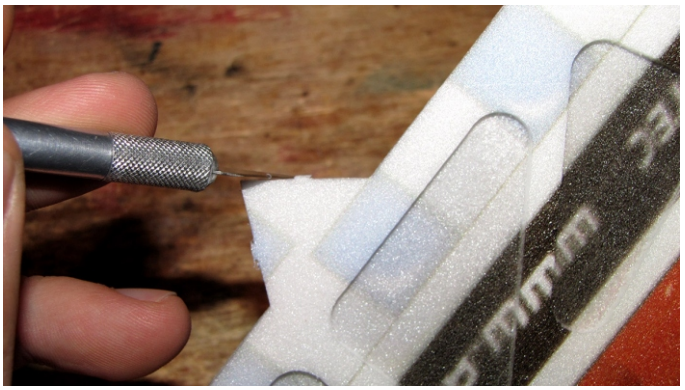
Here you can see fiberglass hardware set. It was done in order to achieve the best control of plane's moving surfaces. Now you can use long servo arms and servo horns. Moreover, you will be able to have less pressure on control rod, use full potential of your servos and not to lose resolution. In addition to this, few small pieces will reinforce certain areas that face many different forces (hard landings, hi-G manoeuvres, etc.).

Required tools and adhesives:

You will need just a few basic tools and materials to finish your *Arrow V.5*:
Sharp hobby knife, file, 1.5mm drill, piece of sanding paper, scissors, screwdriver, solder, and *Donatas Design* bevelling tool.Mercury Adhesives foam friendly CA glues (M100F), Mercury Adhesives Accelerator MH 16 "3M Blenderm medical tape" (further - *Blenderm tape*) for control surface attachment, kevlar thread.

Building:

Split fuselage by using sharp knife. Do not throw out depron "trash" (servo holes' cuts). For example, if you decide to use two aileron servos you can glue back these small pieces inside the fuselage and avoid ''ugly'' holes in this way.

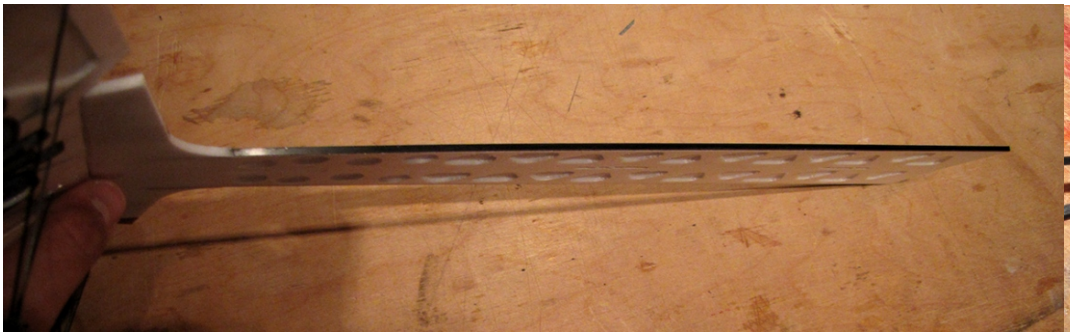


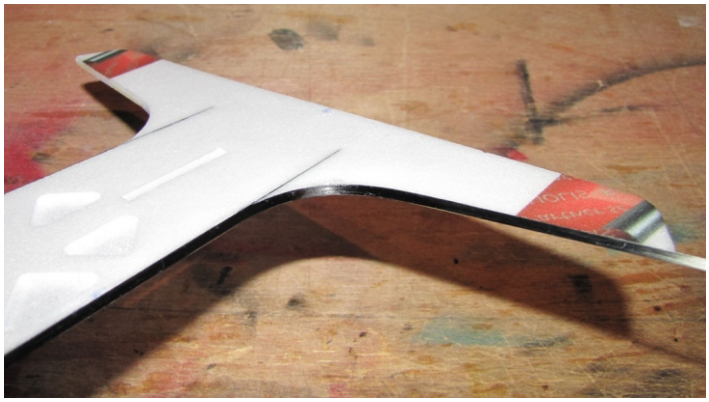
Make sure you remove all steps that were connecting fuselage. Repeat this procedure for all parts.

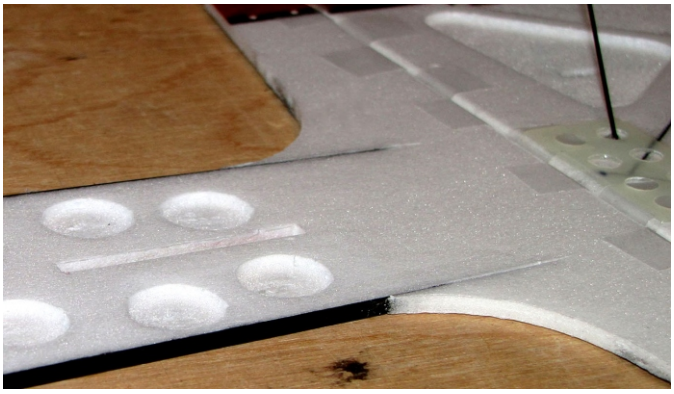
If you want to build lighter plane, here is one suggestion: ''shave" ends of 0,5mm flat carbon. You will save some weight and will have very useful thin carbon.

Cut aileron edge with *Donatas Design* bevelling tool. This will guarantee easy deflection down (when it is attached to the wing), and great clean look .

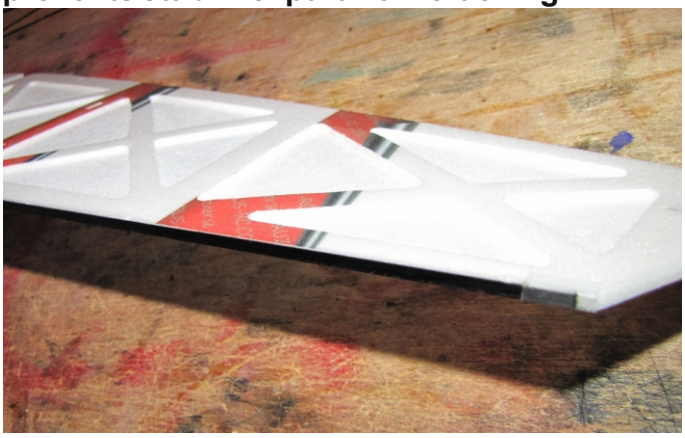
Next step - reinforcement of some critical parts. Here you can see how aileron compensator is being reinforced with thin carbon.

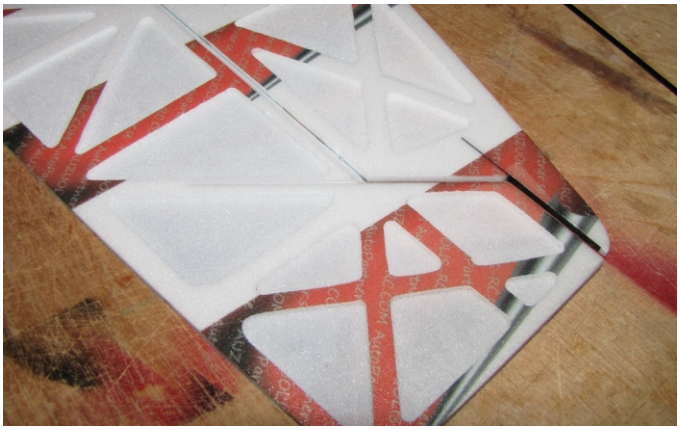




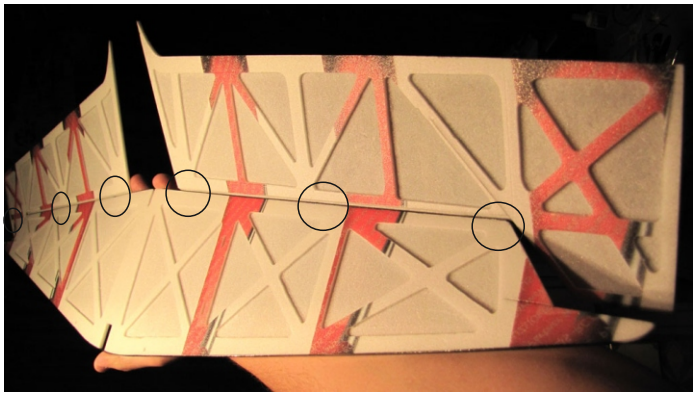


Optional reinforcement: Glue thin carbon (you might use the one that remained after ''shaving" the main carbon parts) like it is shown in the pictures. This gives very good strength for elevator and prevents stabilizer part from cracking.

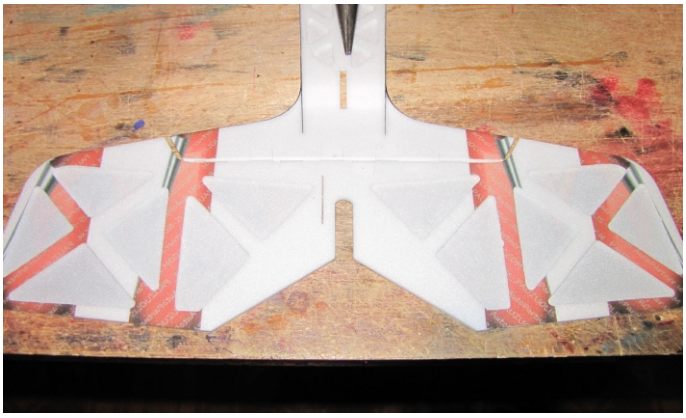


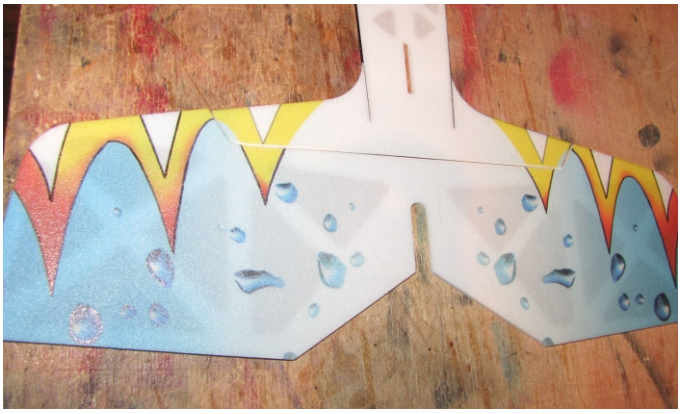


Glue 0.5 mm carbon on the back and leading edges of the wings. Carbon length required for back edge - 70 cm, for front - 83 cm. The very end of carbon is fixed with small piece of *Blenderm tape*.

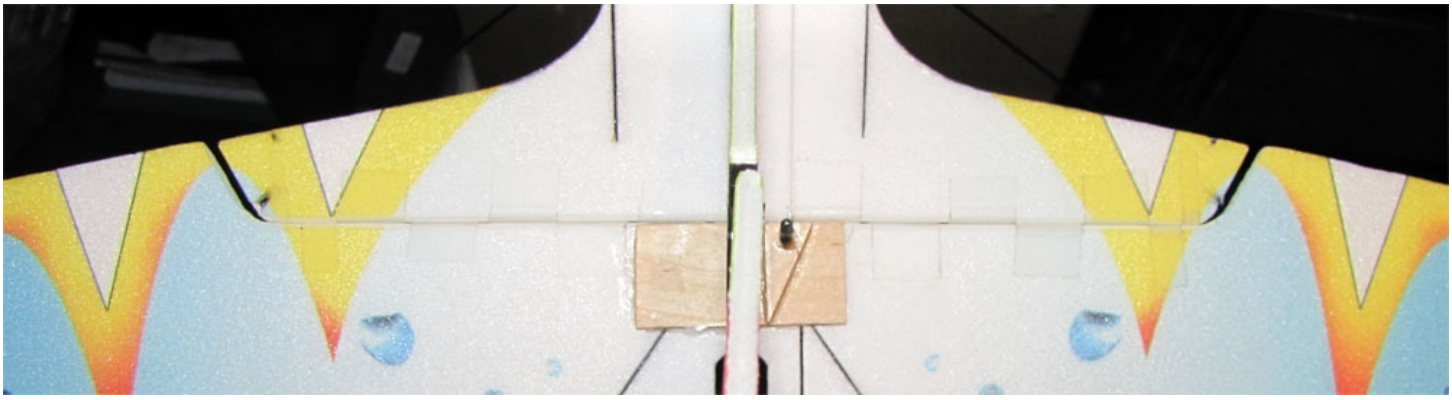


When flat carbon is glued to the wing and aileron edges are bevelled, it is time to attach these two parts. I highly recommend using *Blenderml tape* for this step. It sticks extremely well to depron surface. Moreover, the tape is not shiny so it does not stand out or change colour scheme of the plane.
Black circles in the picture on the right mark certain places where small pieces of *Blenderm tape* should be placed. This reinforcement prevents ailerons from moving away from the wings after many hours of flying.

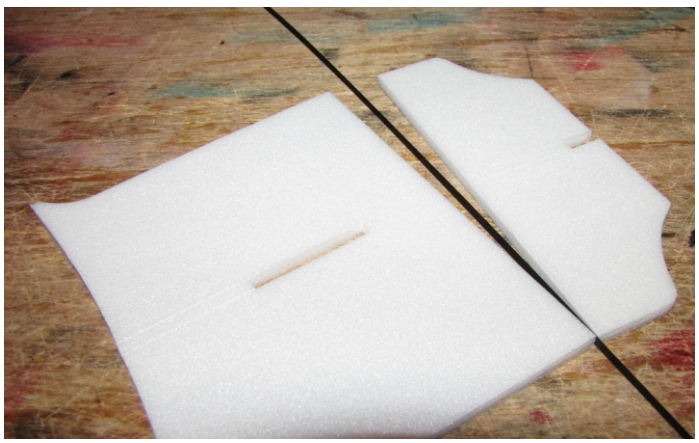


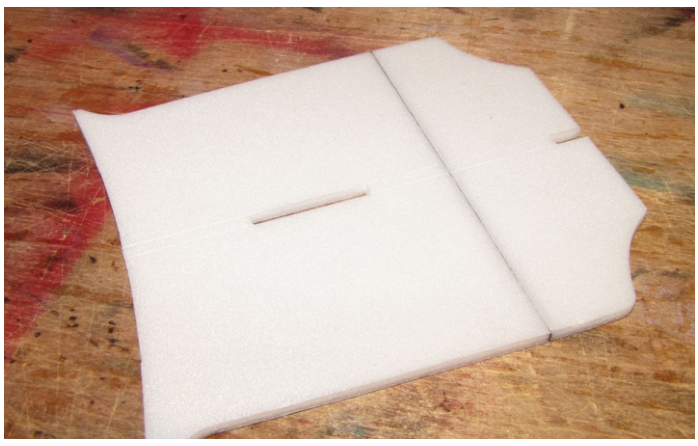


There are few ways of how you can attach elevator to stabilizer. The easy one is to cut control surface in 45 degree angle with *Donatas Design* bevelling tool and to use *Blenderm tape* to attach elevator to stabilizer (in the same way as ailerons are attached to the wings). Such method is good for those who use solid pull-push system. On the other hand, if you use pull-pull cables, the below method is superior because it will keep the tension of the pull-pull cables from displacing the hinge line.

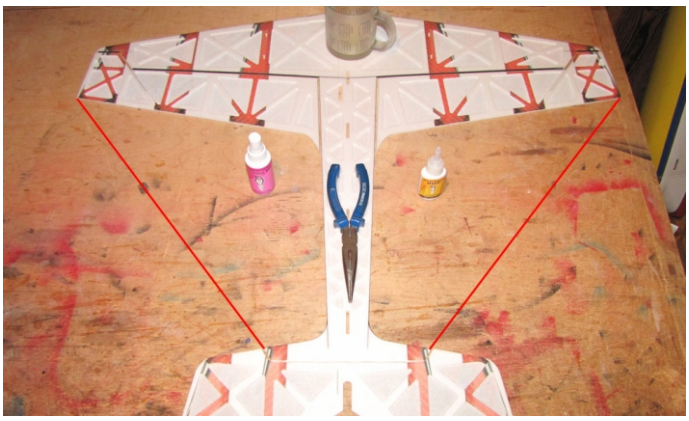


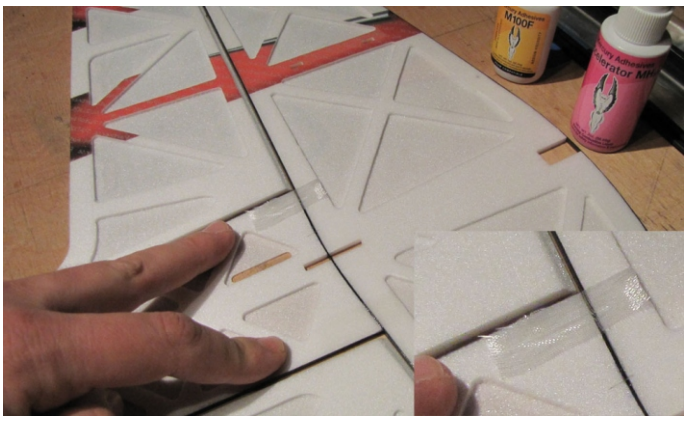
So I use so called ”8” method. As you see in the picture, elevator is connected with stabilizer in old fashioned way. This one was used when people did not have high quality hinges. To use the “8” hinge, firstly use a sanding bar to round the leading edge of the elevator and the trailing edge of the stabilizer. Secondly, prepare about 12 pieces of *Blenderm tape* as follows: take 2 pieces (about 1 x 1.5 cm) and tape the sticky sides (across the 1 cm length) together to form an overlap of approximately 0.5 cm. The result of this should be: 0,5 cm of „neutral“ tape from both sides and 2 cm of sticky tape. Take prepared tape and glue one of the sticky sides on the top of stabilizer. The other sticky side of the tape should be glued on the bottom of elevator. Repeat the same steps with the rest of tape’s pieces. Every second piece should be glued upside-down. This way of connection is the best for pull-pull cables. It allows deflecting surface up to 180 degree with no effort. Moreover, „8" method will help to withstand pull-pull cable tension forces and will guarantee elevator’s stay in place for a long long time.



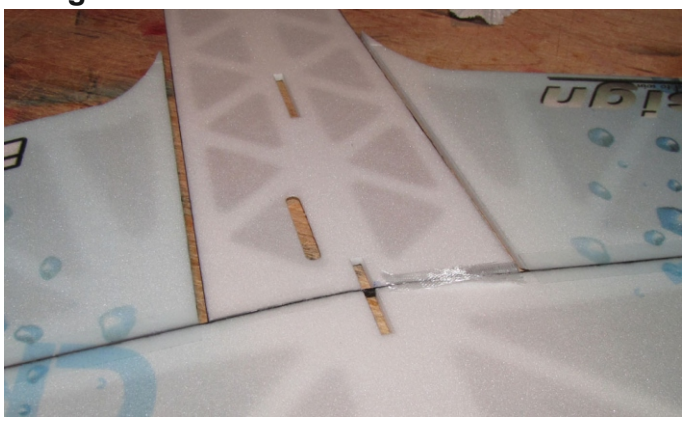


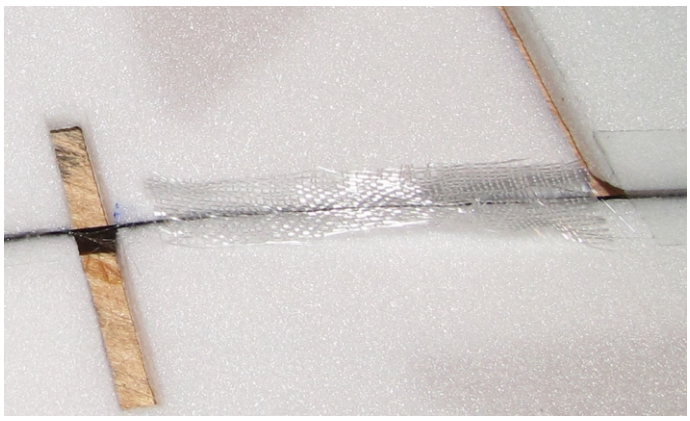
Some of us use TVC (Trust Vector Control) system. It puts a lot of forces on motor mount and front part of the plane. Here is one small trick how you can deal with these problems: cut off about 3 cm of plane’s nose and glue in thin carbon piece. This will help you to make plane’s nose much stronger and to reduce noise caused by high G manoeuvres.



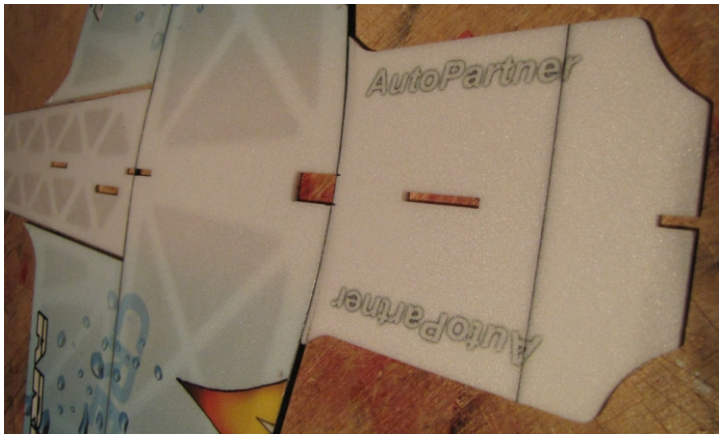


The time for the most important step of *Arrow V.5* building has come. You should place tail section to the main wing precisely as shown in the picture. Use some heavy objects to press separate parts on the flat table. Measure distance from each wing tip to stabilizer very carefully. It has to be the same on the both sides. You should also make sure that nose's, wings', and tails' tab line is straight.



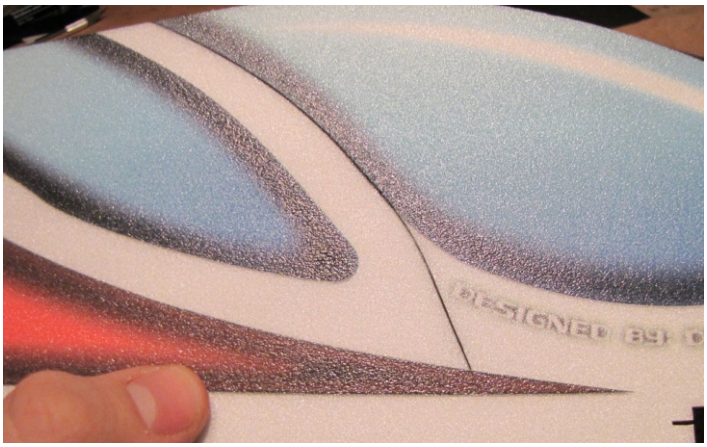


Every shockflyer has its' weak points, one of these - the place where wings are attached to the fuselage. My advice is to reinforce this area with fiberglass cloth. Cut a small piece of fiberglass cloth, put few drops of foam friendly CA glue, and stick it as it is shown in the picture. Make sure that glue spread evenly, and all material is wet. If it happens so that you put some extra amount of CA, clean it with paper towel. Remember that any extra weight is unwanted. And too much of CA glue is one of the areas where you can collect weight very quickly. You may check this by weighting your CA bottle before and after plane building (the difference you get will be the weight you put on your plane in the form of glues).

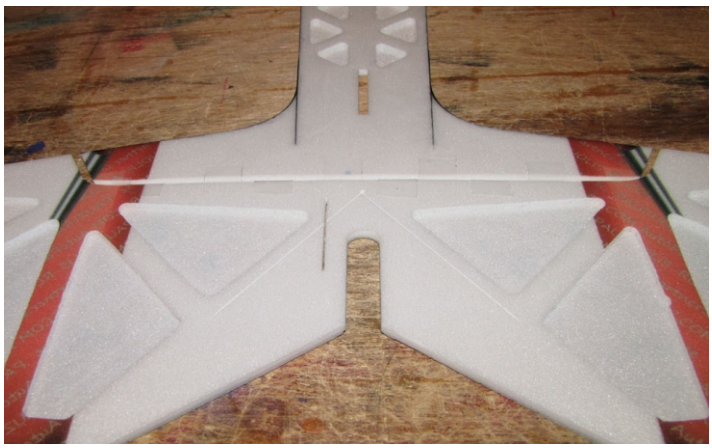


The next step in this stage of building - attachment of the front of the plane. Glue it as it is shown in picture on the left. Make sure cut out for fuselage tabs are aligned with the cut outs in the wing and tail.

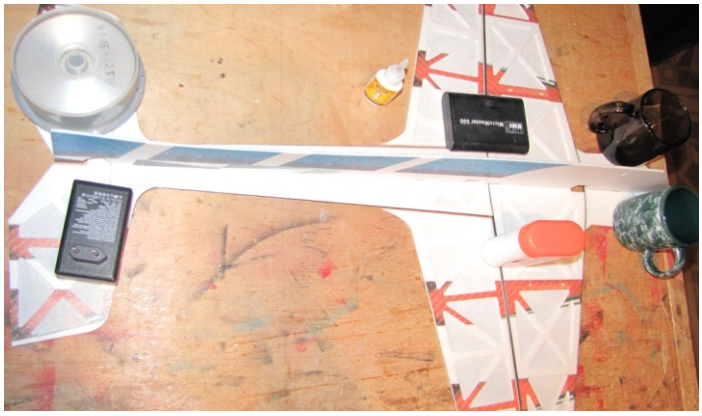
You can see one more additional reinforcement for top part of fuselage in the picture on the right. Using sharp knife make a careful cut as it is shown in the picture. The Best way is to stick to the outline of the cockpit, this way carbon reinforcement will not stand out.



Glue a flat thin carbon piece to reinforce the top of the fuselage; this reduce the likelihood of the depron bending if an inverted landing occur.

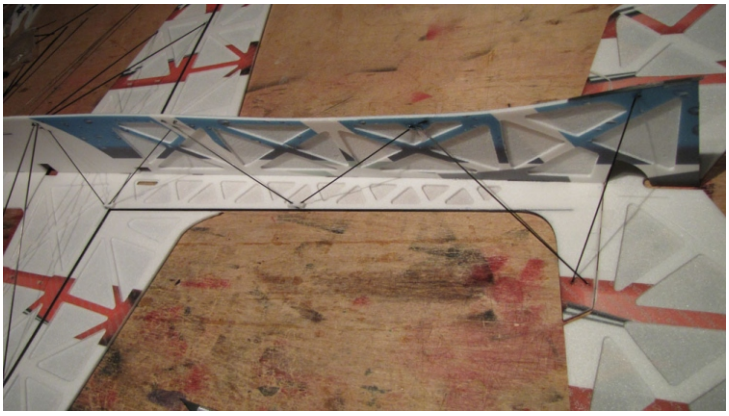


Cut slots for the “V” shape carbon reinforcement. This is necessary step to ensure that both sides of the elevator will deflect exactly the same for precise control.

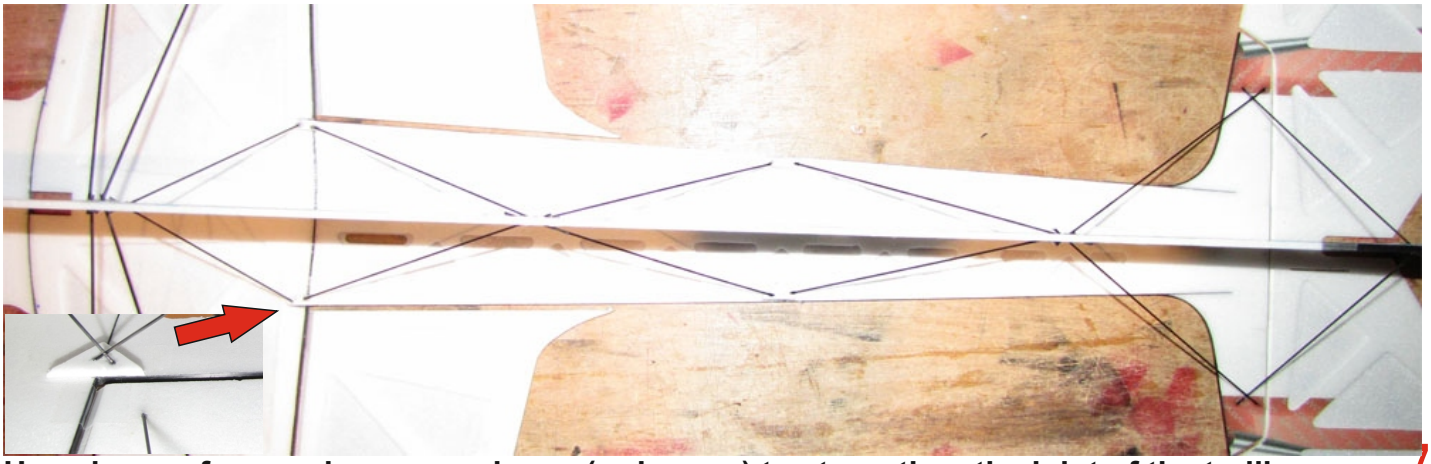


Glue the bottom part of fuselage inverted on the flat table. Put some heavy objects on tail and wings.This will help to keep them straight. It is very important for precise flying plane.

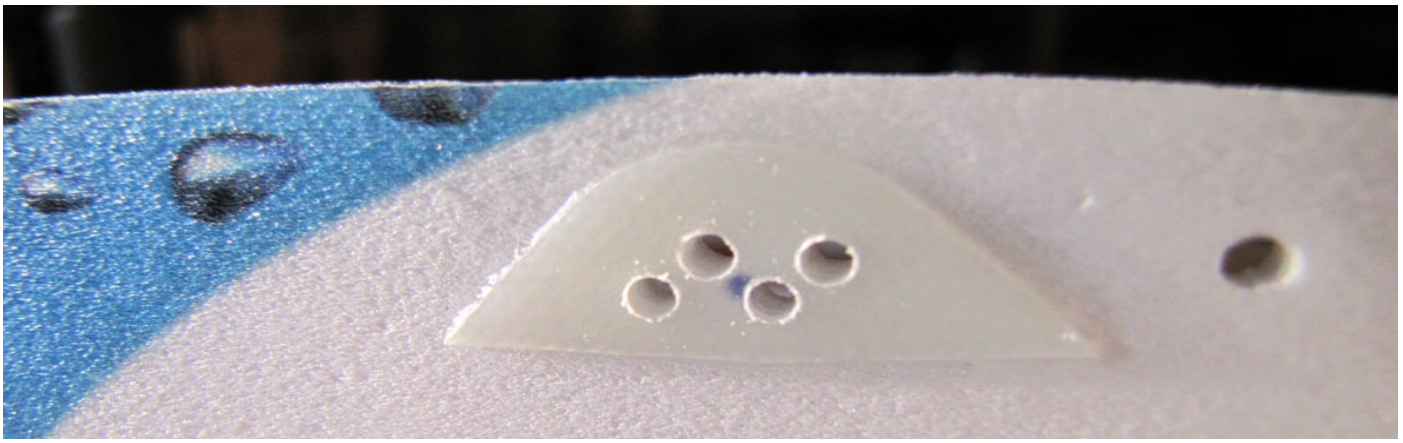
Now lets add 1 mm carbon rods to reinforce the fuselage structure. Sand the tips of each carbon rod before gluing to increase adhesion. To aid accurate construction, use a pair of square items like CD covers or credit/phone cards that have 90 degree angle. Place these objects (plastic cards are my favorite) from both sides to keep the depron bottom perpendicular to the horizontal fuse.



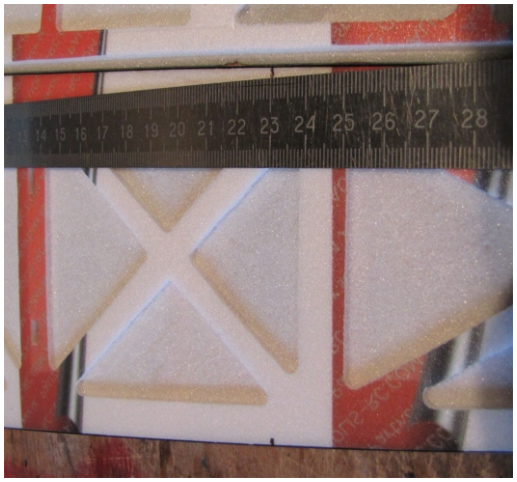
The last picture shows all carbon rod reinforcements for the tail and back of the fuselage. This type of reinforcement is both 50% lighter than old fashion depron box and more torsionally rigid, keeping the wing and stab aligned during rolls.

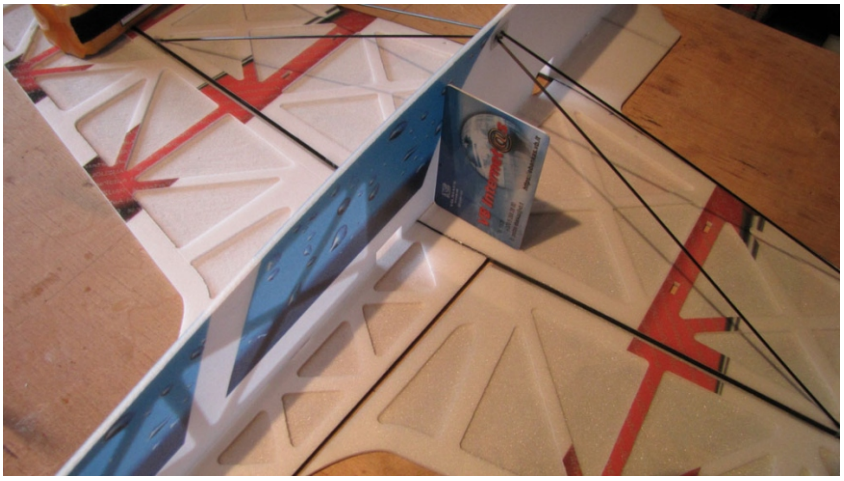


Use pieces of scrap depron as shown (red arrow) to strengthen the joint of the trailing edge of the wing with the fuselage and the carbon rod bracing.

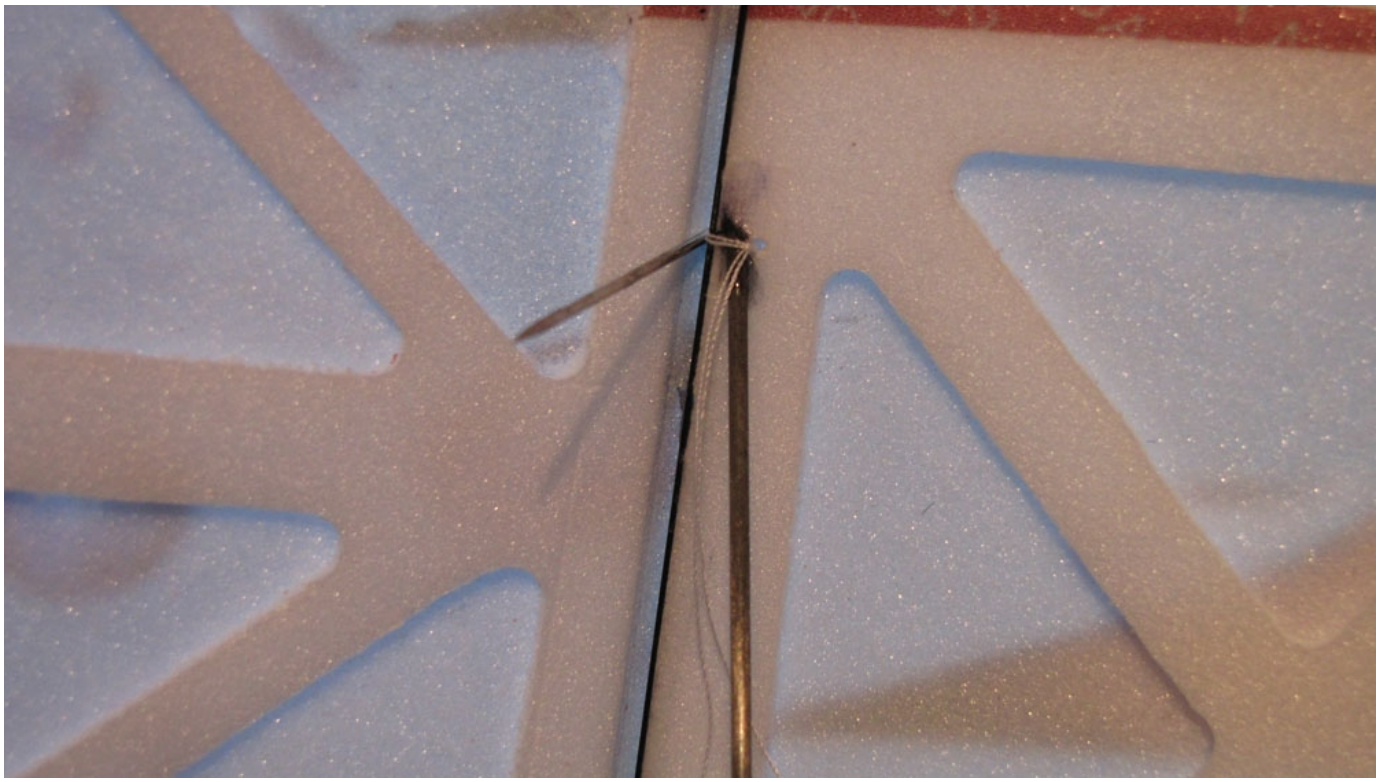


Now we need to prepare the main wing support. Here you can see reinforcement piece made from 0.5 mm fiberglass. You will find a similar part in your *Arrow V.5* kit. Glue it at the centre of the wing chord on the bottom of the fuselage.

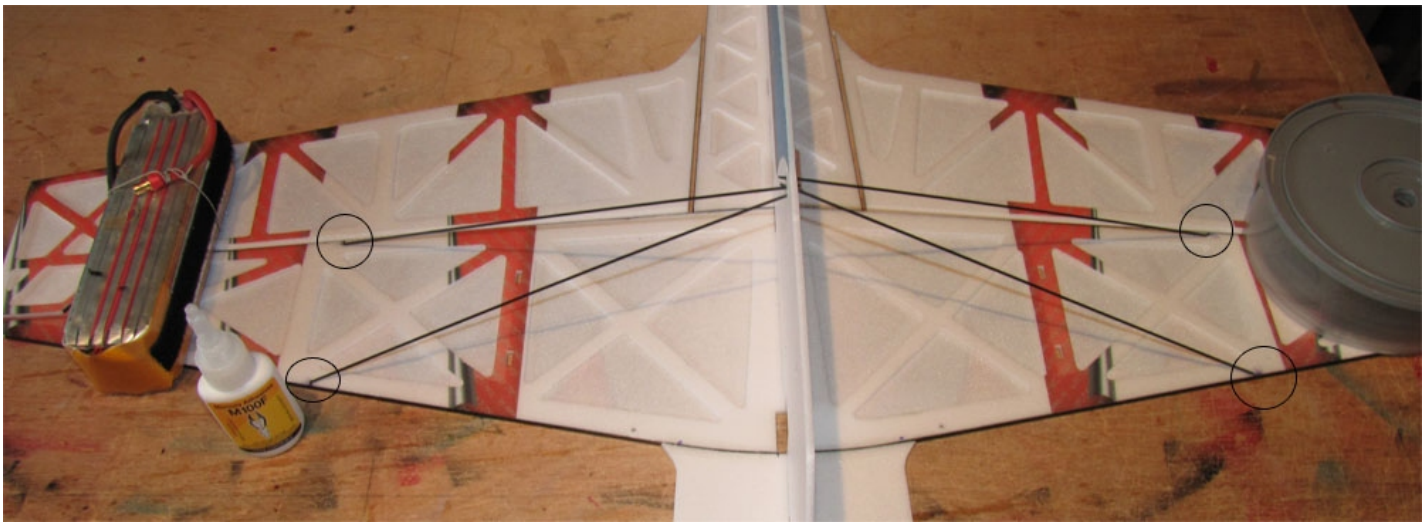




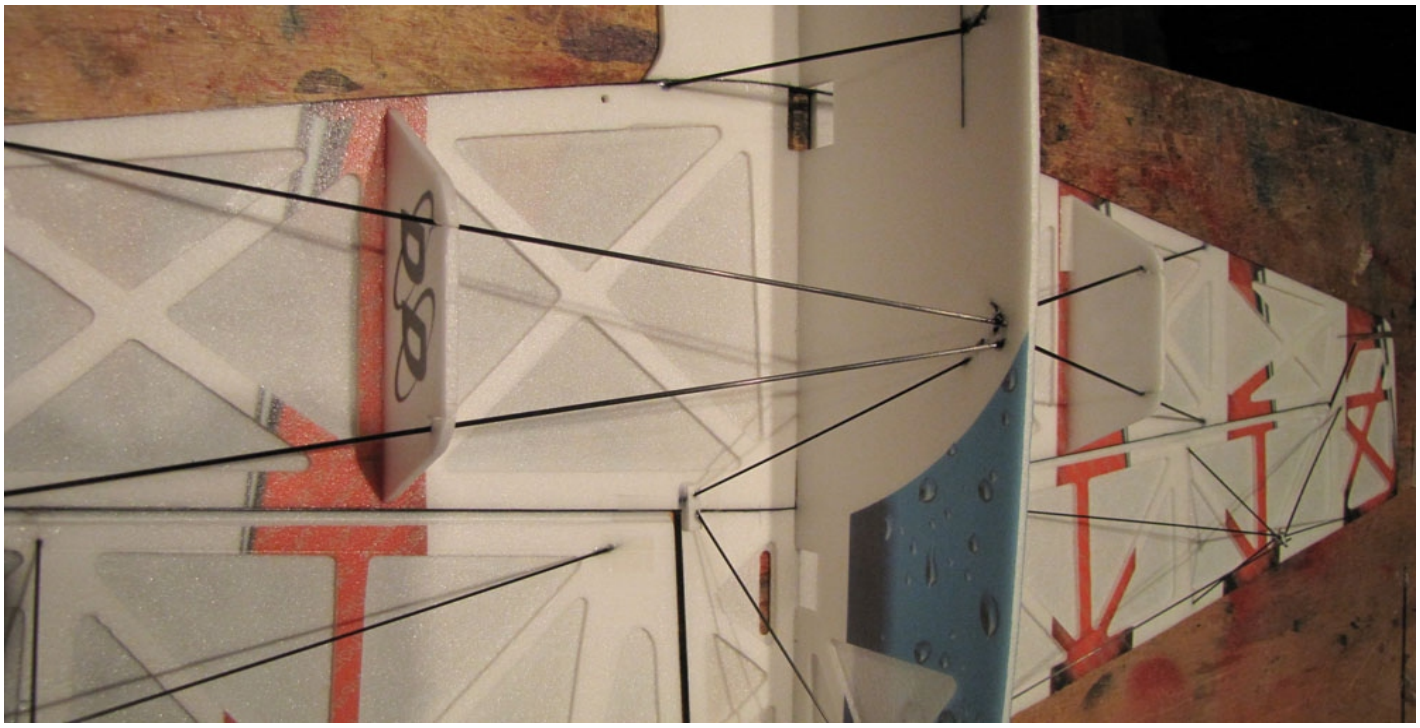
Mark 23 cm distance (measuring from fuselage towards wingtip) on the leading and trailing edges of the wing (both sides). These are attachment points for the 1.5 mm carbon wing support rods (26 cm long each). Use plastic cards to make sure the fuselage remains at a 90 degree angle to the wing. DO NOT GLUE 4 carbon rods in the centre yet.



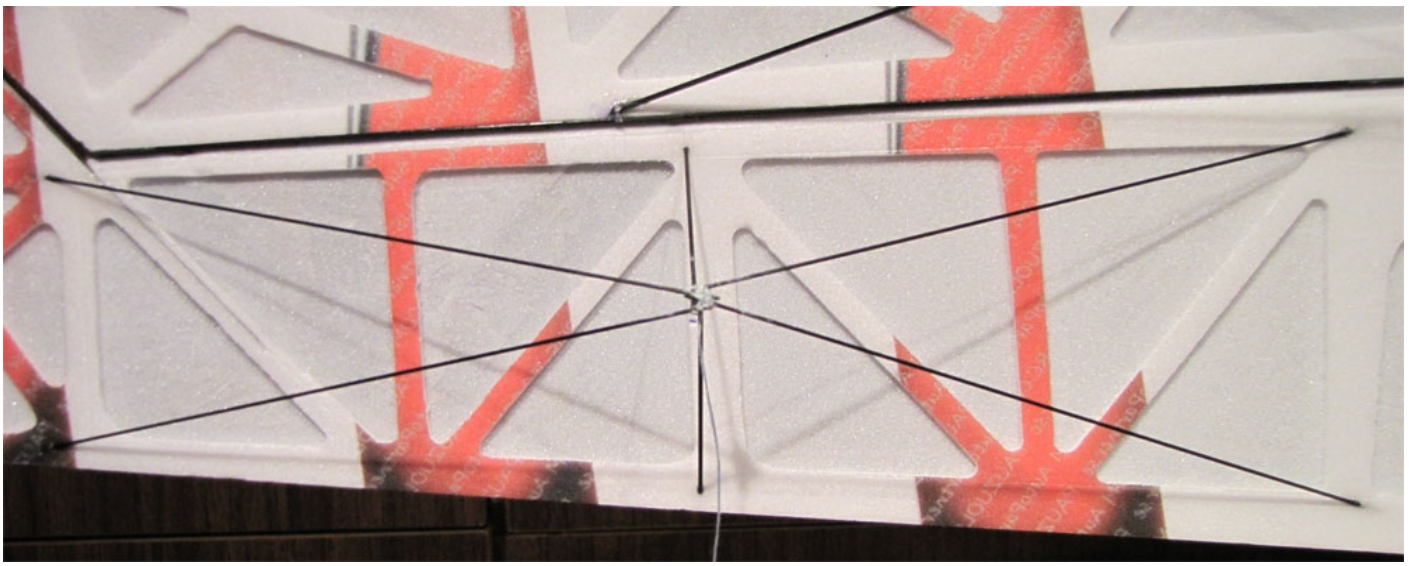
Glue four carbon rods to the main wing. Using needle and Kevlar thread make a couple loops to tie together the carbon rod and flat carbon (you will have to remove the plane from the table for this step). Couple drops of CA glues on top will guarantee an amazing strenght. Wings will remain in the same position no matter how hard you will fly your plane.



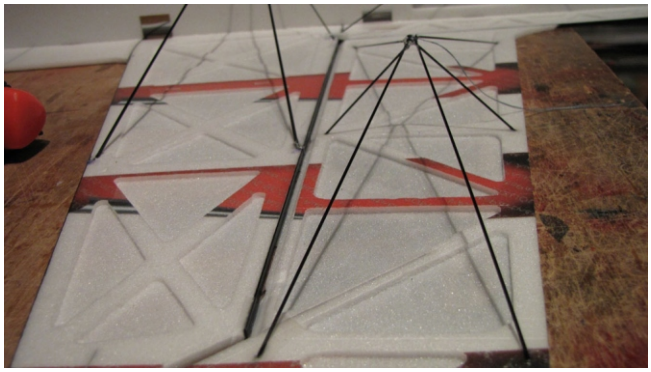
Now, when carbon rods are glued to the wing and Kevlar thread is in place, return the plane to the flat table. Use some weights to press it down to table. Now double check vertical fuselage position and glue the four carbon rods to the fuselage.

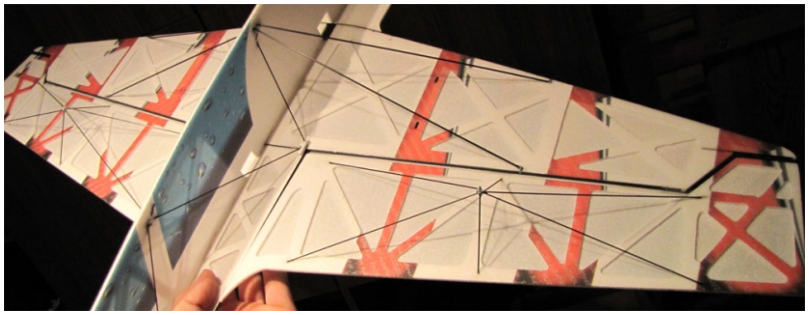


Now you can glue two support SFG's from depron to the wing support carbon rods.

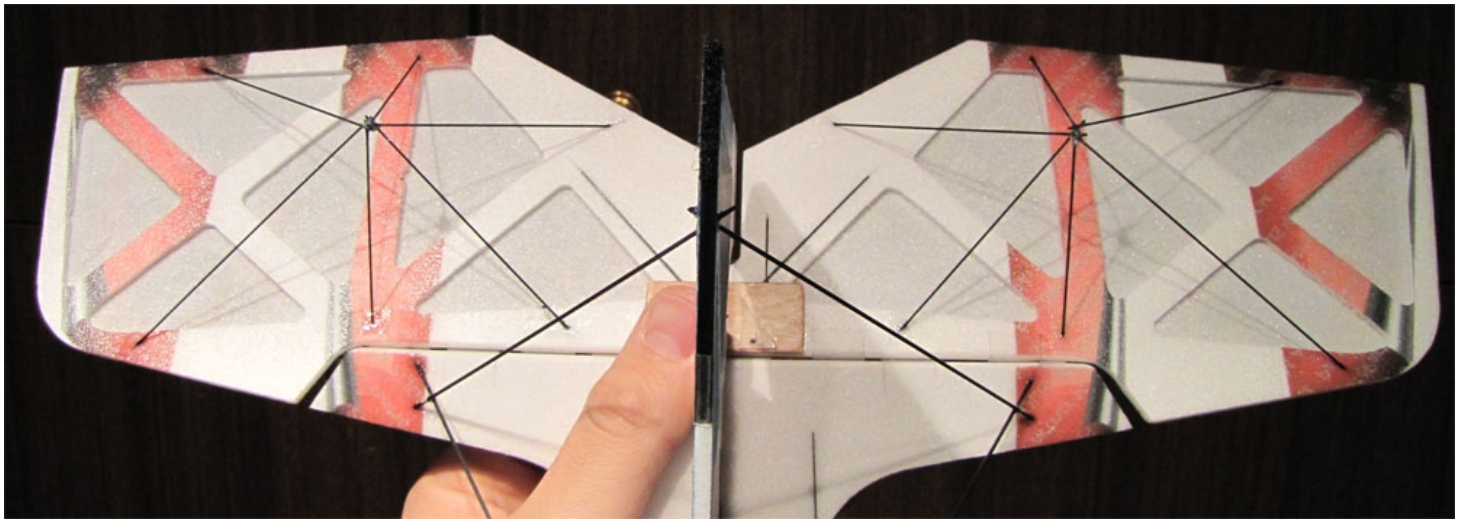


This is optional aileron reinforcement using 1 mm carbon rod. This upgrade reduces aileron flex and makes roll control more precise and is highly recommended for *Arrow V.5*.

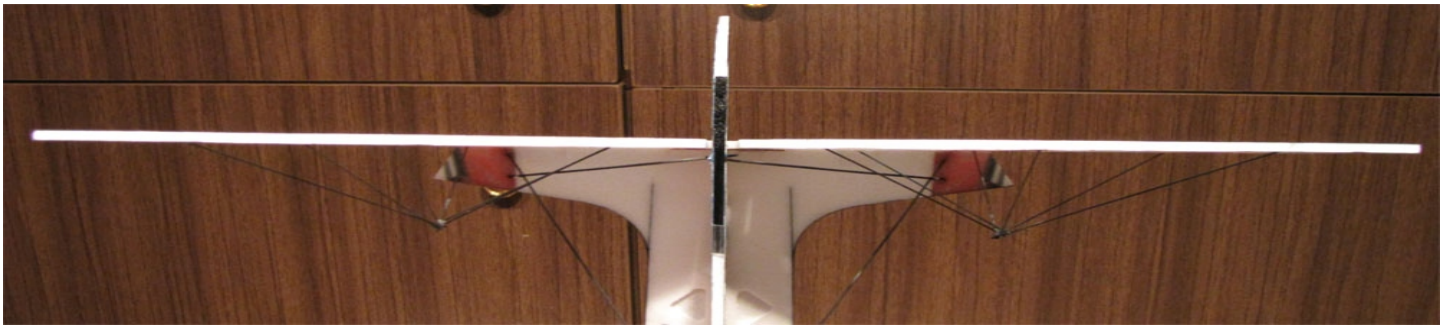




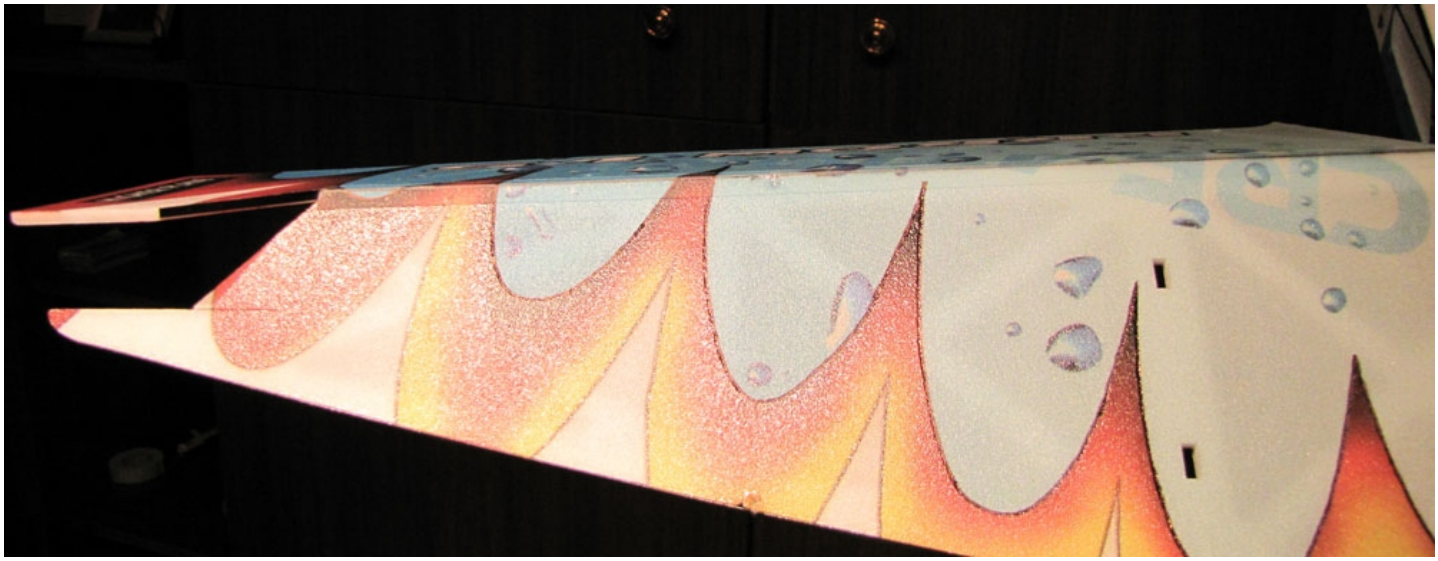
Carbon structure from different angle.



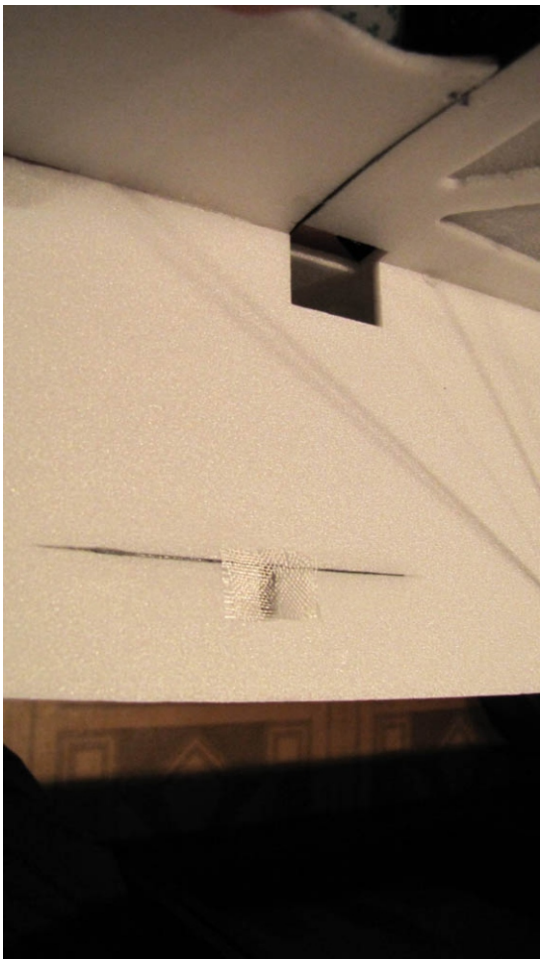
It is now a good time to glue flat carbon pieces into the “V“ shape slots we cut earlier. After gluing the flat carbon inside the depron slots, glue fiberglass square plates on the top and bottom of the elevator as shown in the picture. Similar to the optional aileron reinforcement, 0.7mm carbon rod (not included in kit) can be used to stiffen the elevators on *Arrow V.5*.

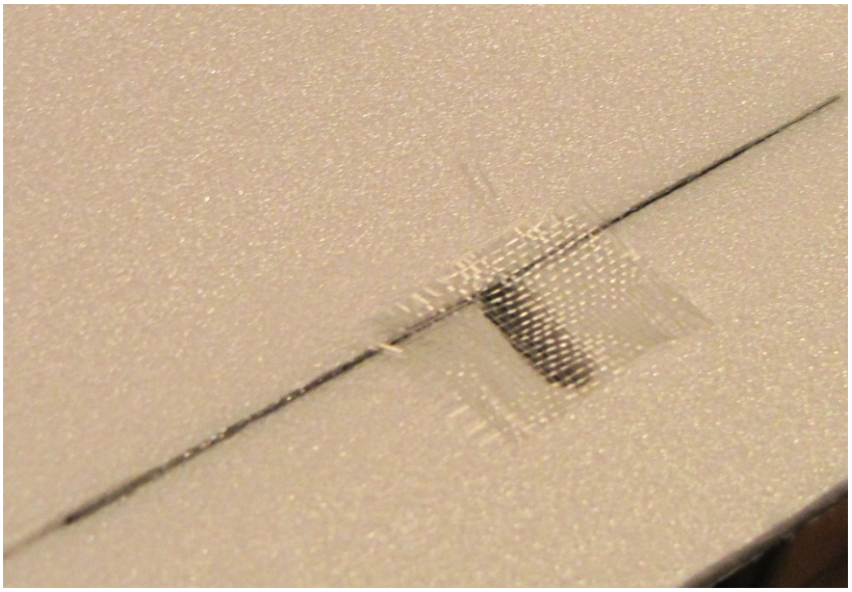


When all updates are installed, make sure elevator is flat and deflect easy to both sides.

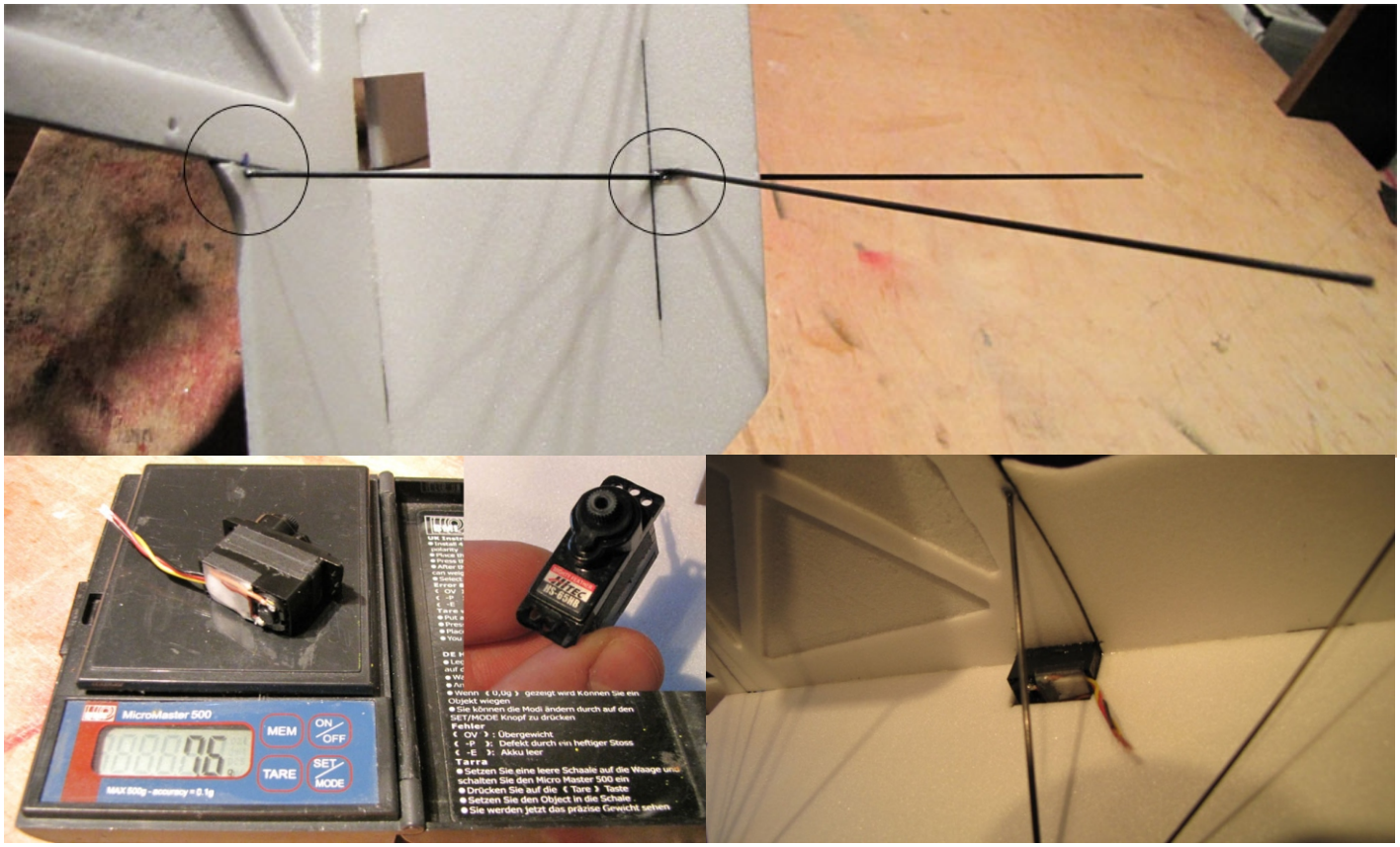


When all updates are installed, make sure aileron is flat and deflect easy to both sides.



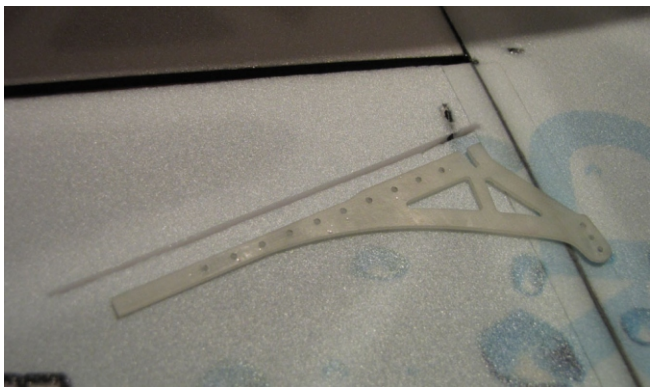


Landing gear should be installed before starting works with the top of the fuselage. Start by reinforcing the bottom of the fuselage with a 6 cm piece of thin carbon and fiberglass cloth. Landing gear legs are made of 1.5 mm carbon rod and are 24 cm long. Mount the gear legs as shown in the picture angled slightly forward towards the motor. This will provide stable standing on the ground. I also highly recommend tying the gear legs to the wing leading edge flat carbon, using kevlar thread and needle, as it was done for the wing support rods.

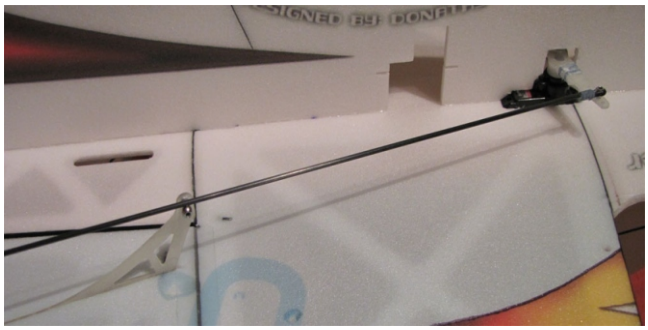


Now it is time to decide what aileron servo configuration will be used. *Arrow V.5* has very big and powerful ailerons, so strong servos are required. Single servo option is a Hitec 65HB connected to 6 volts (if connected to 2S lipo, it will burn out after ~50 flights). Two servo option is either JR290Gs or JR188s. JR290s are heavier, but have a very precise geartrain that will stay tight for hundreds of flights. If smaller weight is your priority - JR JR188s is the better option. All of these high quality servos are a bit heavy, but can be lightened, as shown for this Hitec 65HB: screws and bottom case should be removed, and servo should be reinforced with *Blenderm tape*. Please keep in mind that such modifications will likely void manufacturer's warranty.

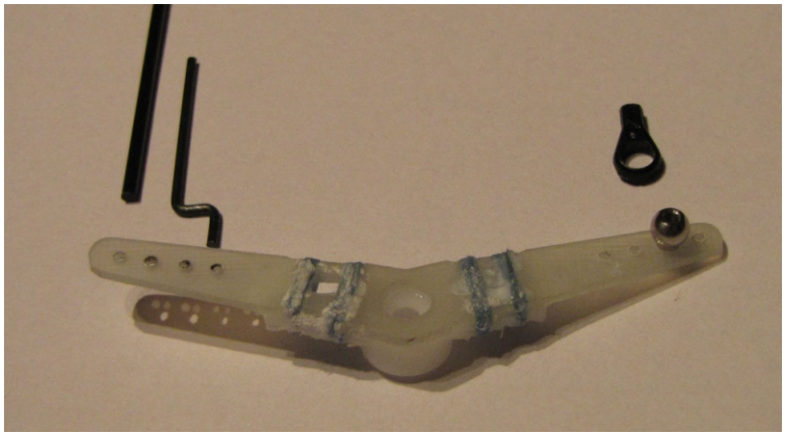
If you decide to use single servo, install it in the cut out of the wing, and glue the top of the fuselage as it is shown.



Cut slots in the ailerons for the aileron horns. Try to keep them as symmetrical as possible. Next step - neutralize (zero) the trim and sub trim on the aileron channel of your radio, and put an original servo arm on the aileron servo, as close to the center position as possible. Then glue provided fiberglass offset servo to the original servo arm making sure it is centered exactly. After this 100% of servo throw is available for control deflection, giving the best possible resolution and maximum equal deflection to both sides. Reinforce the joint between the fiberglass arm and the original arm with a couple wraps of kevlar thread, and then saturate the thread with CA (complete this step with the arm off of the servo). Glue Z-bends on each carbon rod's side. Such carbon rod will connect servo arm with control horns. Z-bend linkages are included in the kit for regular use. A competition upgrade to improve precision is the use of tiny ball links. I learn this trick from top USA pilot and builder Devin McGrath. Ball links are not included in the kit. The ones I use are T-Rex 250 from Horizon Hobby.



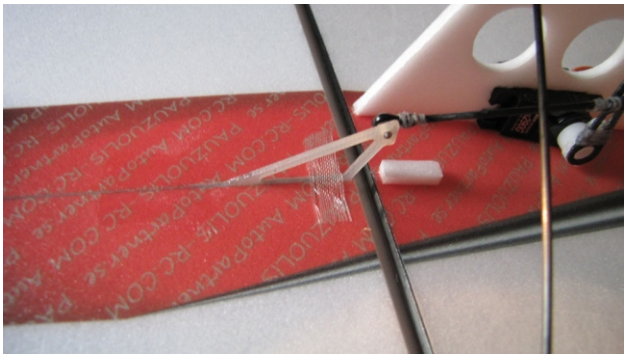
I use top hole on servo horn and second (from side) on servo arm.



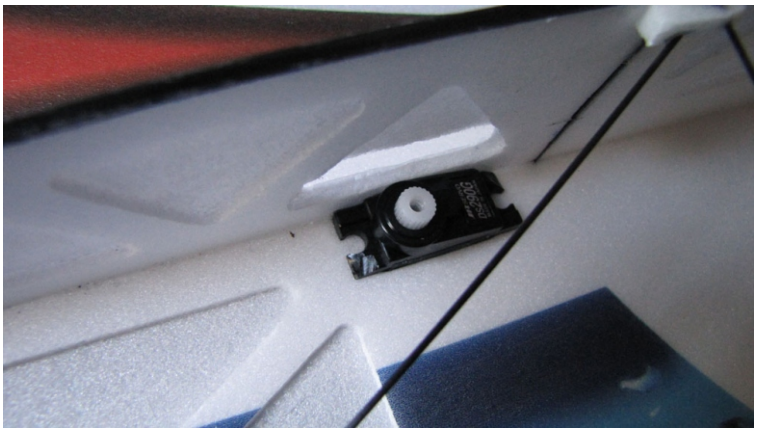
Here you can see push rod connected to servo arm. It is ready for final adjustment and attachment to aileron control horn. This is difficult part because there is no good way to adjust length of push rod, so you have to measure few times to be sure it will be right size.

I use top hole on servo horn and second (from side) on servo arm. Whether using ball links or Z-bends, attaching them to the 1.5 mm carbon push rod is done the same way. On one end of the push rod, overlap the carbon rod and Z-bend (or plastic housing of ball link) and glue together. Reinforce this joint with several wraps of kevlar thread, and saturate the thread with glue. Now, using some scrap of depron, make a pair of "clamps" to hold the ailerons centered. Attach the completed end of the push rod to the servo, and attach another Z-bend (or ball link assembled) to the control horn. Cut the carbon push rod to length that slightly overlap the Z-bend (or ball link) attached to the control horn. When satisfied with the length, glue the push rod and Z-bend (or ball link) together. Remove the push rod, and wrap the remaining joint with kevlar thread.

If you decide to use two aileron servos, glue foam into the single aileron servo mounting location. To prepare locations for two servos, cut servo size holes in both SFG's as shown. Having two aileron servos will require a little more setup work, but in my opinion is worth the time for the advantages gained. First it will be much easier to place battery where ever you want without interference from the aileron servo or linkage. The goal is to place all equipment such that the proper center of gravity is achieved without the battery. In this way, different size/weight batteries can be used at the same location without affecting the CG. Another advantage of two aileron servos is the ability to use flaperons. Flaps/elevator mixing can give some unique and crazy manoeuvres. And last but not least, when two aileron servos are use, the control horns are located in the middle of the aileron, reducing span wise flex of the ailerons.

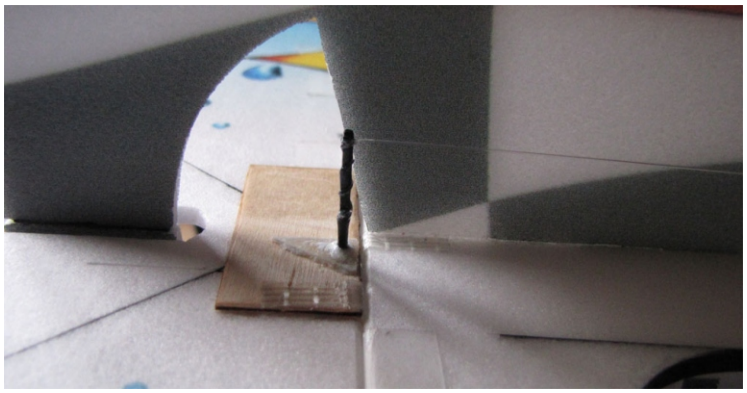


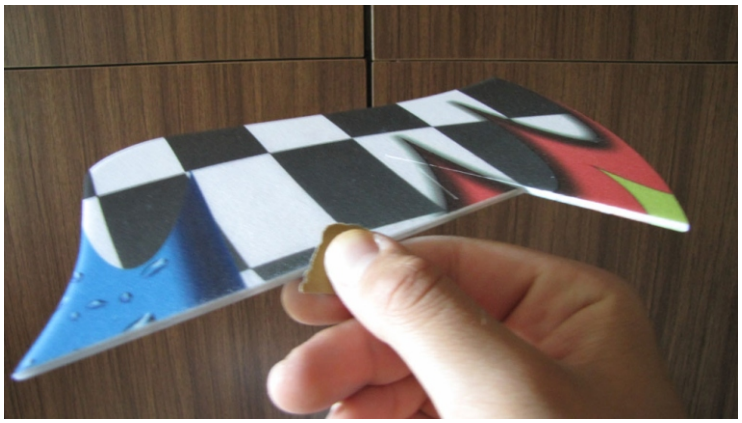
Fiberglass cloth is used to reinforce the control horn mount. Try to use a short carbon rod with precise attachment of servo to aileron with no play. Picture shows ball link connected to first version of hardware. As with the single servo, there are two options for connections of the carbon pushrod. Z-bends are supplied in the kit, and can be upgraded to T-Rex 250 ball links.
NOTE! Hardware in the picture is slightly different from the one you receive in kit.



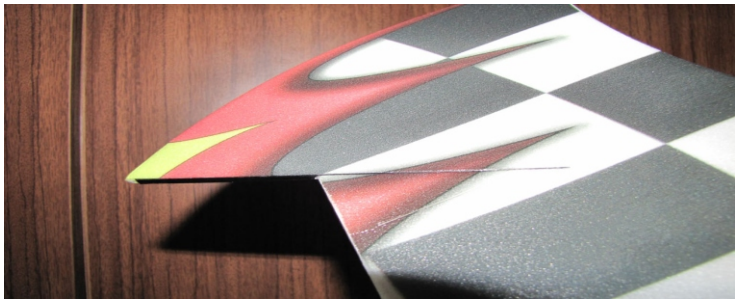
Now it's time to prepare elevator servo. Here are some ways you can save weight on JR290G. Remove the servos screws and bottom of the case, and hold the servo together with *Blenderm tape*. You can cut down weight to 7.4g, which is a very good weight for a high performance digital servo. The 290G has a very precise set of gears that will remain slop free for many flights. I use and recommend this servo for both elevator and rudder control.

Servo arm prepared for elevator's pull-pull. A piece of 50 mm x 1.5 mm carbon rod is glued to a JR290G servo arm and reinforced with several wraps of kevlar thread. As with the aileron servo(s), center the servo arm and carbon rod with the sub trim and trim to 0 to ensure equal servo travel to both sides.

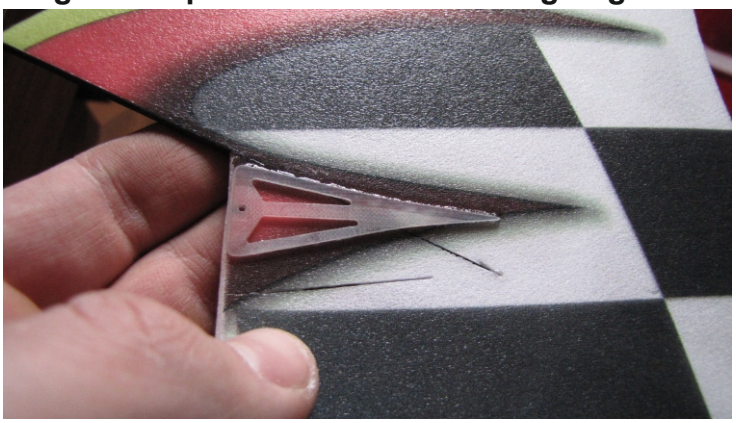


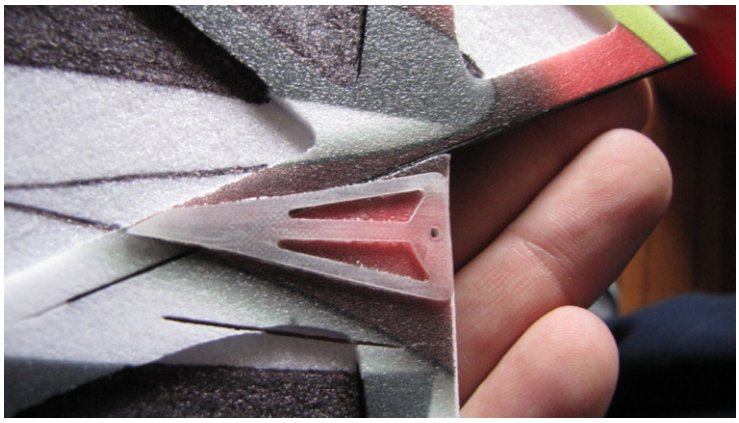


Here you can see 40 mm x 1.5 mm carbon rod installed to elevator. It must be exactly same length on both sides. The provided cable material will work fine. On the other hand, if you decide to use ball links instead of Z-bends, I recommend using ”upgraded” material (I use it for my competition models). Firstly, 5KG fishing line is wound around the elevator carbon rod (and glued), and then with a very small amount of tension, it is wound and glued to the carbon rod on the elevator servo. After this is done for both sides, the fishing line is spiral wound with kevlar thread (and saturated with CA). This combination of materials provides extremely good control without “spring effect” and the tension is constant regardless weather conditions.

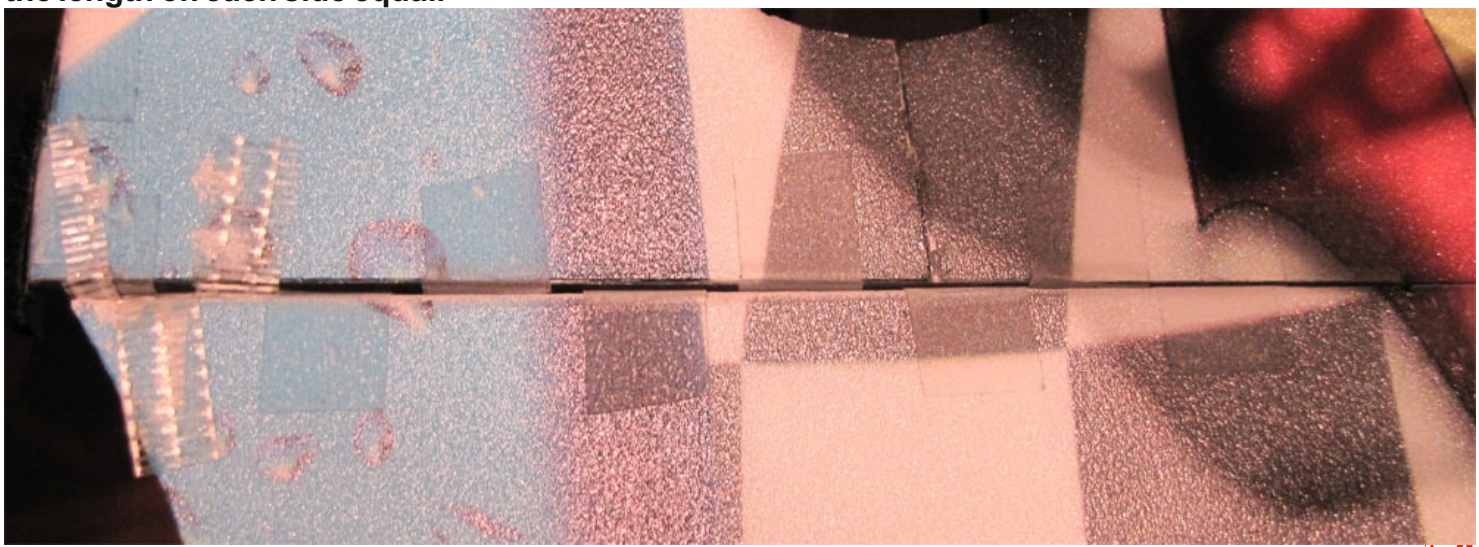


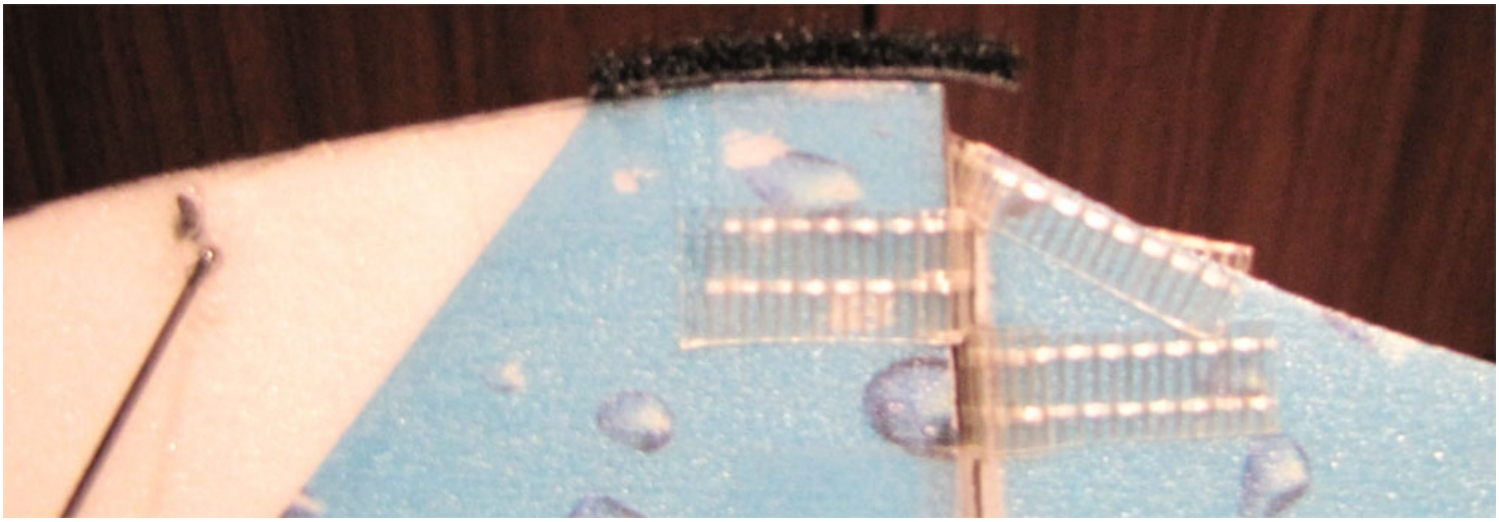
The last surface to complete is the rudder. As with the elevator, I recommend using pull-pull control system with the same “8" hinging method. Also very important upgrade for rudder strength and its long life is a piece of thin flat carbon going from counterbalance to middle of rudder.



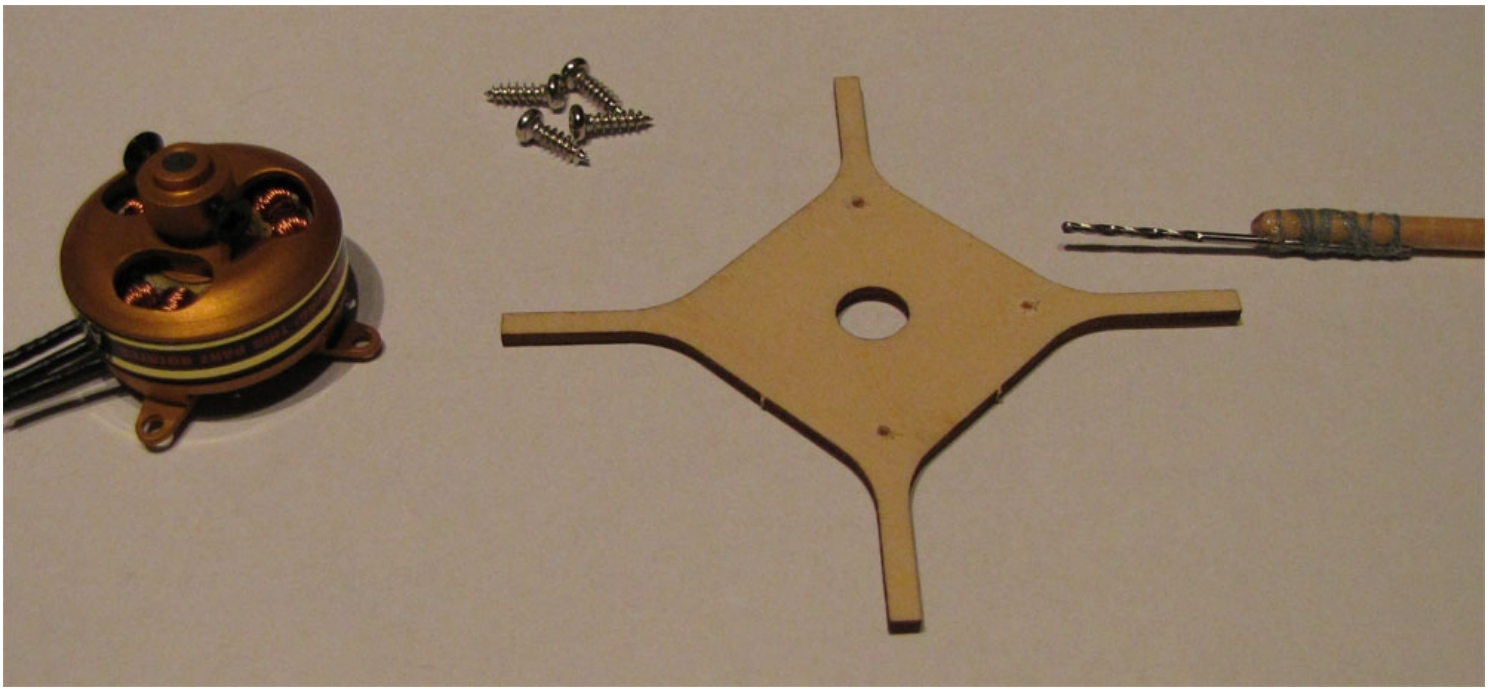


Using foam friendly CA glues attach fiberglass triangle pieces to rudder as shown in the picture, keeping them close to the hinge line. Make sure the triangle pieces are glued to the thin flat reinforcement carbon. Carefully glue a 45 mm x 1.5 mm carbon rod into the triangle pieces, keeping the length on each side equal.

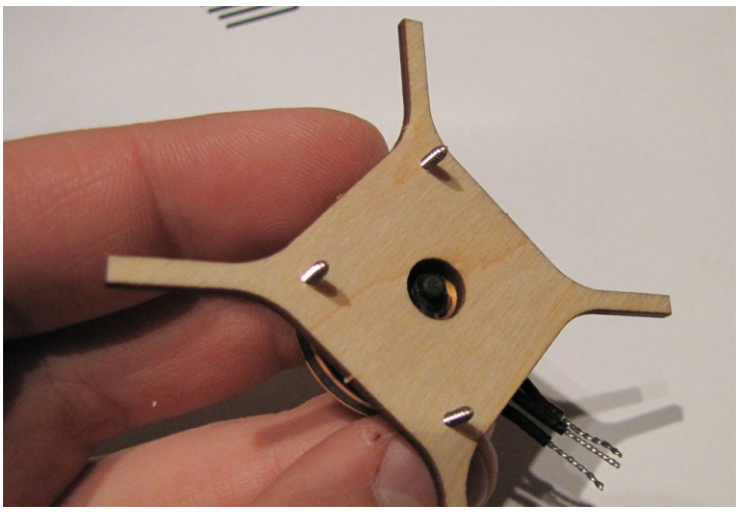


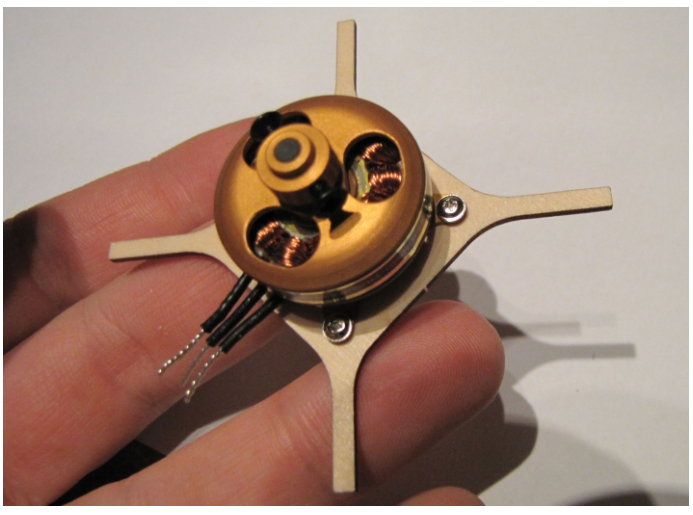


For extra strength, the bottom hinges can be completed using fiberglass tape. I also put soft Velcro on tail skid area to prevent noise during takeoffs and landings.

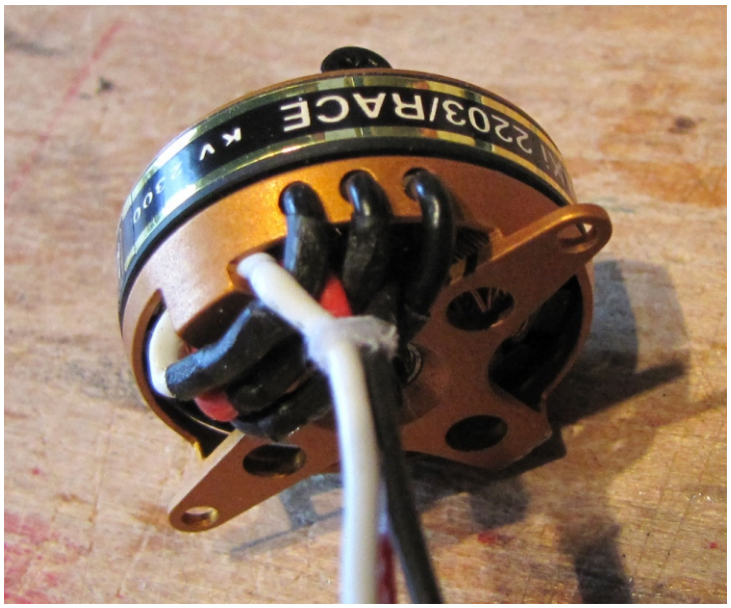


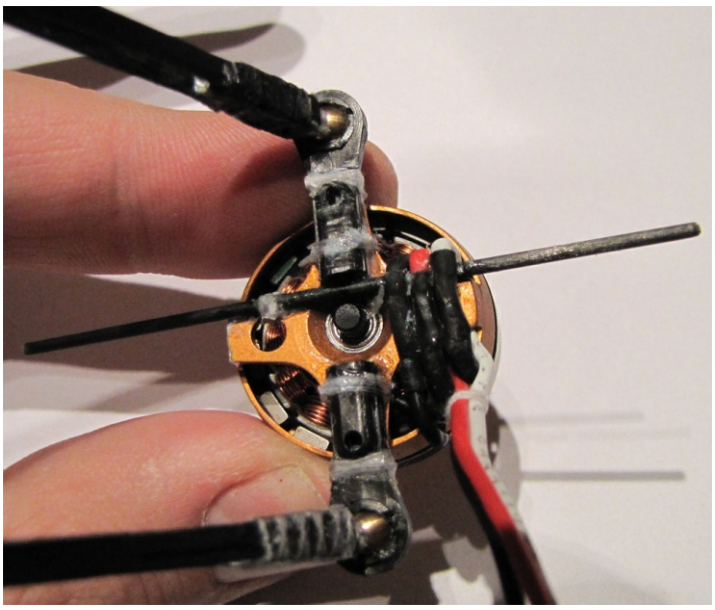
The standard motor mounting method uses either the wooden or fiberglass mounts in the kit. Using your motor as a template, mark hole locations on the mount, and attach the motor with screws. Check the angle of the nose of the plane before gluing the motor mount. There should be 1-2 degrees of right thrust and no up/down thrust. If you need to change angle after few test flights, I recommend using shims of thin wood between the motor and motor mount.





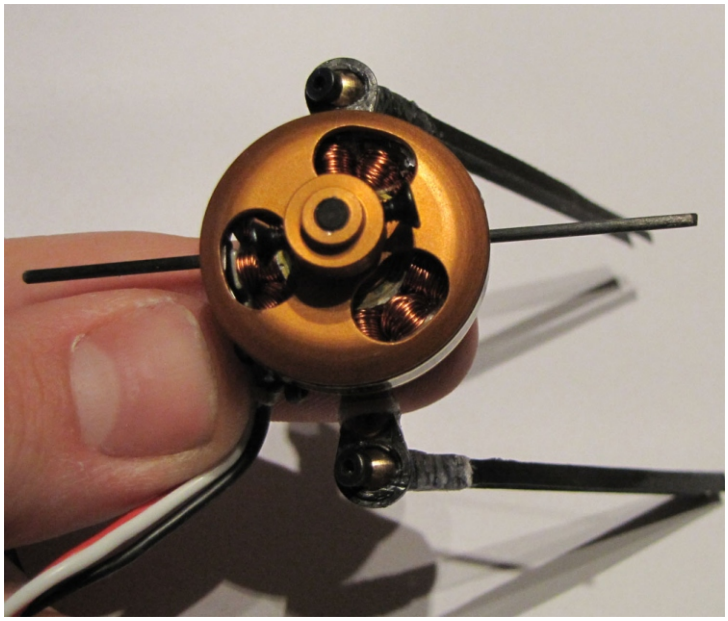
After gluing the motor mount to the plane, each "leg" of the motor mount can be additionally secured with a piece of *Blenderm tape*.



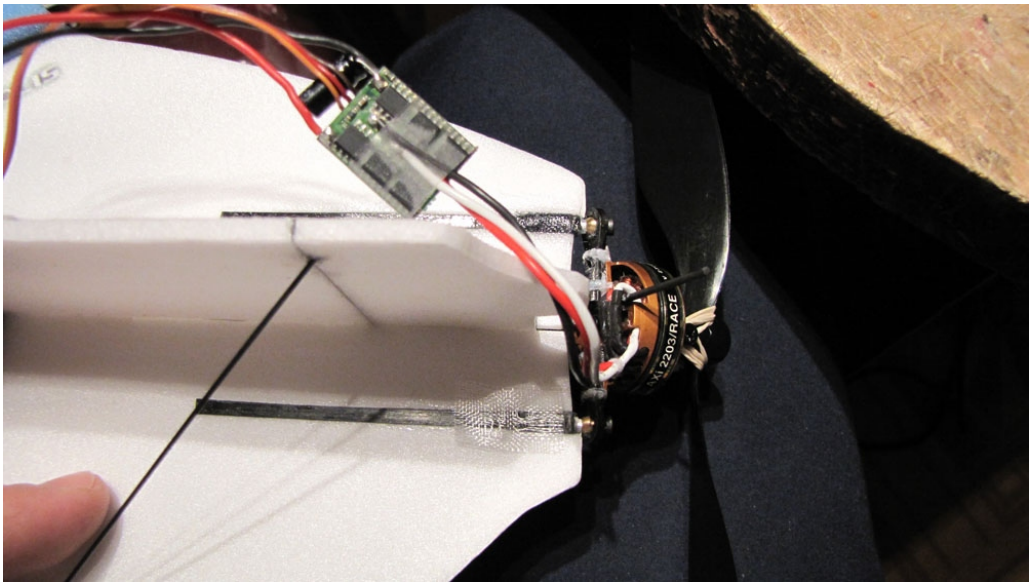


Optional: For more advanced pilots, I recommend trying TVC (Trust Vector Control) system to allow some crazy manoeuvres. Motor moves side to side with TVC, controlled by the rudder servo. Here you can see construction of such system. I use ball links connected to motor for smooth and noise free system. Please keep in mind that the motor wires may break from repeated bending as the motor moves. For this reason, support the motor wires as shown in the picture so that the much more flexible wires of the Castle Creations Phoenix 10A ESC will be bending. This method has been 100% reliable for me.

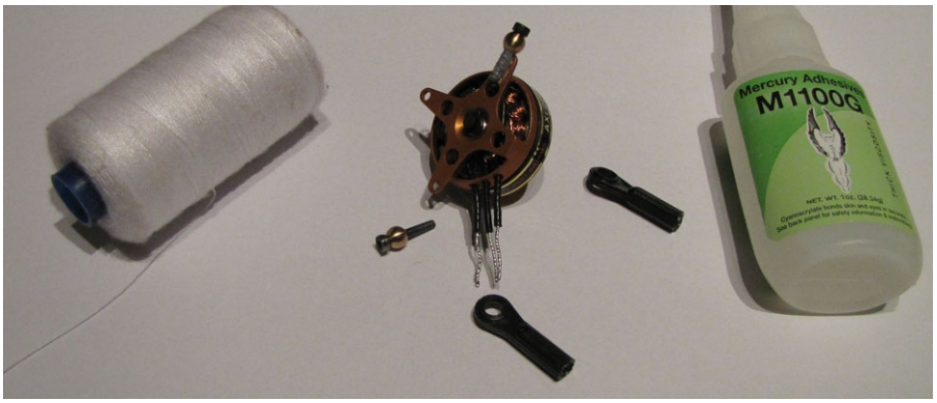
Depron cut out for motor with TVR system.

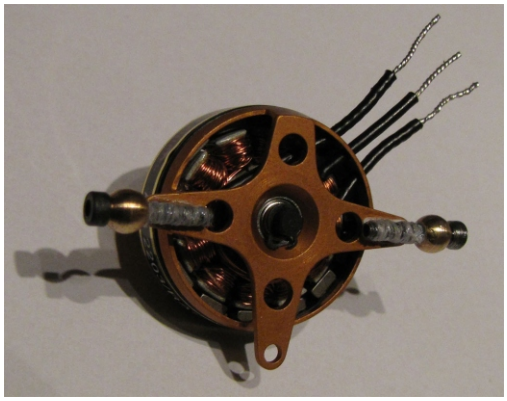


AXI2203/Race motor (view from the front).

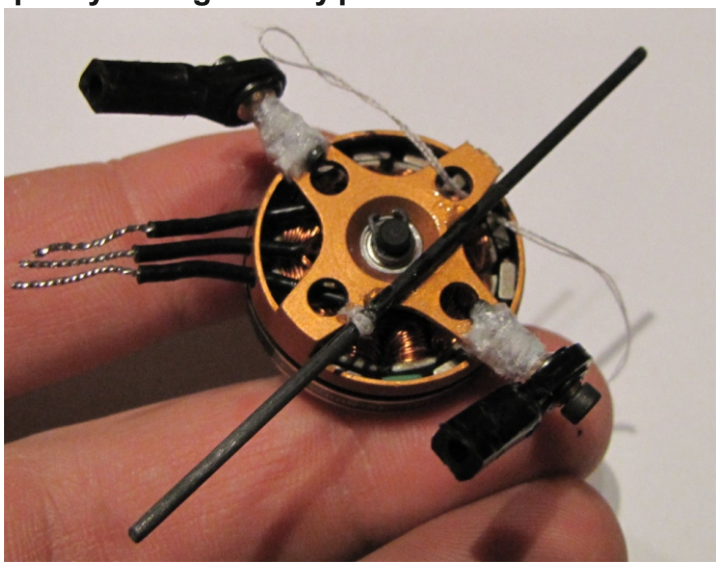


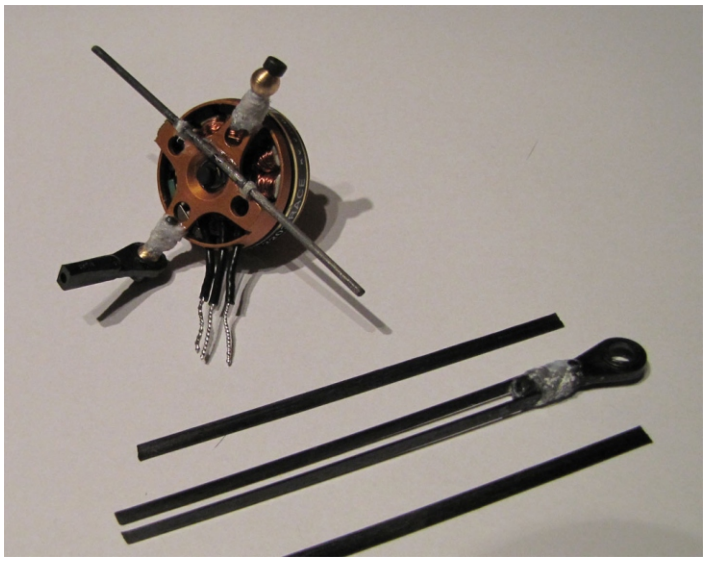
Here you can see the completed motor installation. Fiberglass cloth adds strength to the motor mounting area to handle the added stresses from TVC. The Castle Creation ESC will be mounted on the right side of the plane about 5cm from motor mount. With the motor deflected fully to the left, attach the ESC, allowing just a small amount of slack in the wires between the ESC and motor.





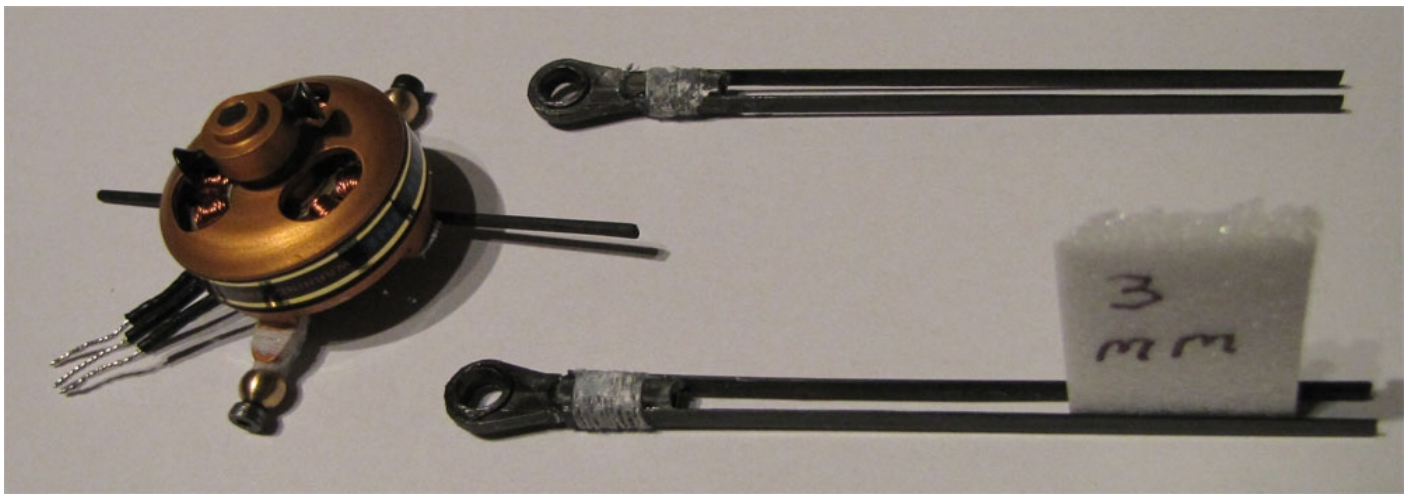
Here is the alternative way to make motor mount for TVC. The same M2 size ball links are used. Wrap bolts with thread and CA (gluing to the motor will be easier). I recommend to use good quality strong CA. My personal choice is Mercury Adhesives M1100G, this is extremely strong CA

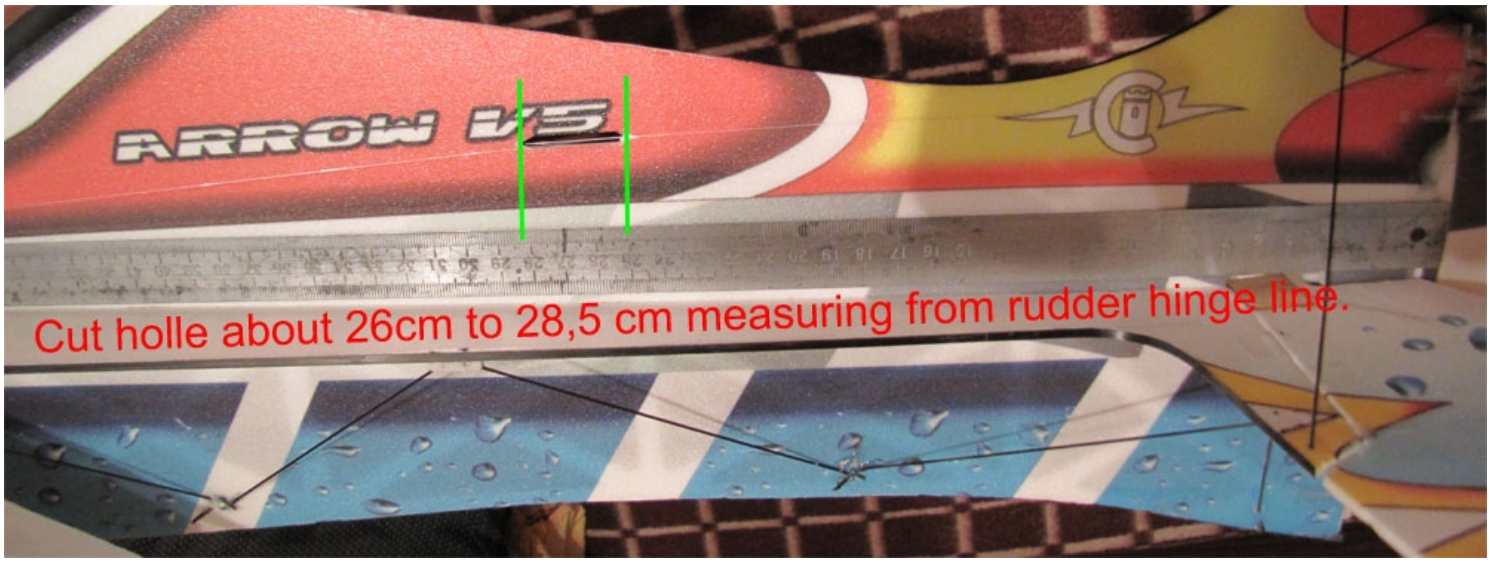




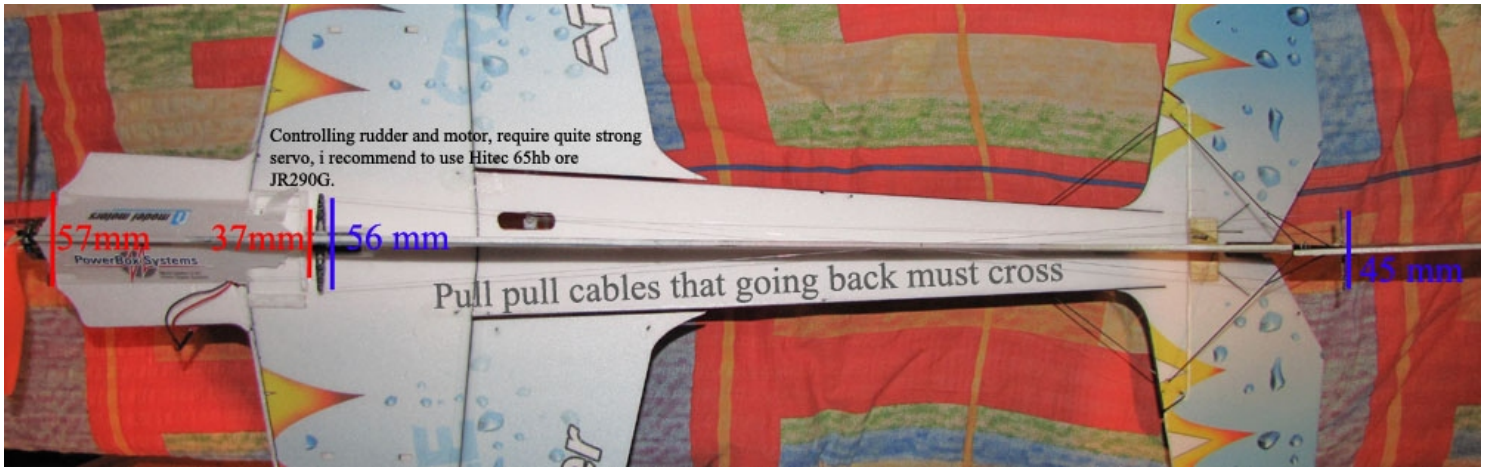
Glue 1.5 mm x 60 mm carbon rod as is shown in the picture. This carbon rod will be used for connection with rudder servo. Reinforce the glue joint with kevlar thread as CA alone will not handle the high forces of TVC.

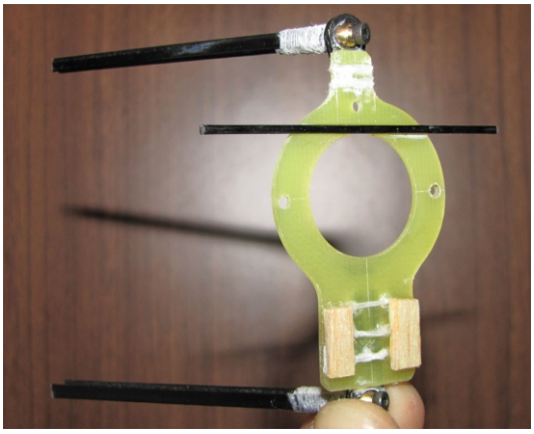
Picture on the right: 4 pieces of 0.5 mm thick flat carbon measuring 3 x 70 mm. With a sharp knife, trim the plastic ball links to 3 mm thick, making flat spots to which the carbon pieces are glued (and wrapped with thread). This is the easiest way to have TVC system on your *Arrow V.5*.





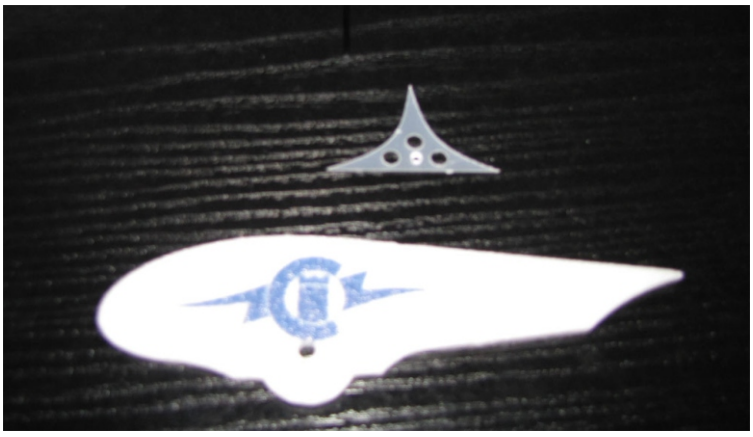
TVC systems that use one servo to control both the motor and rudder need to have the pull-pull cables crossed for the rudder to have the motor and rudder moving in the correct directions. You can see exact measurements for connecting TVC system In the picture below.

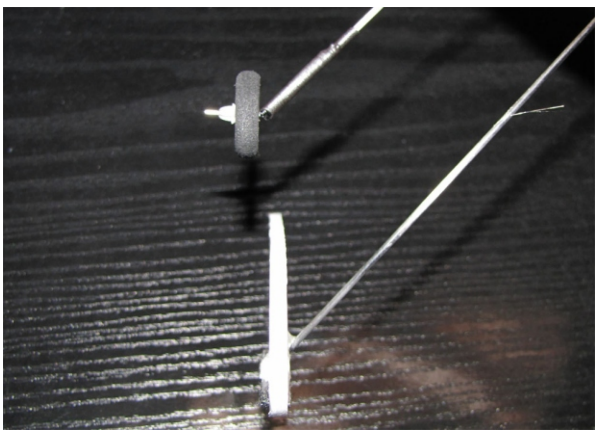


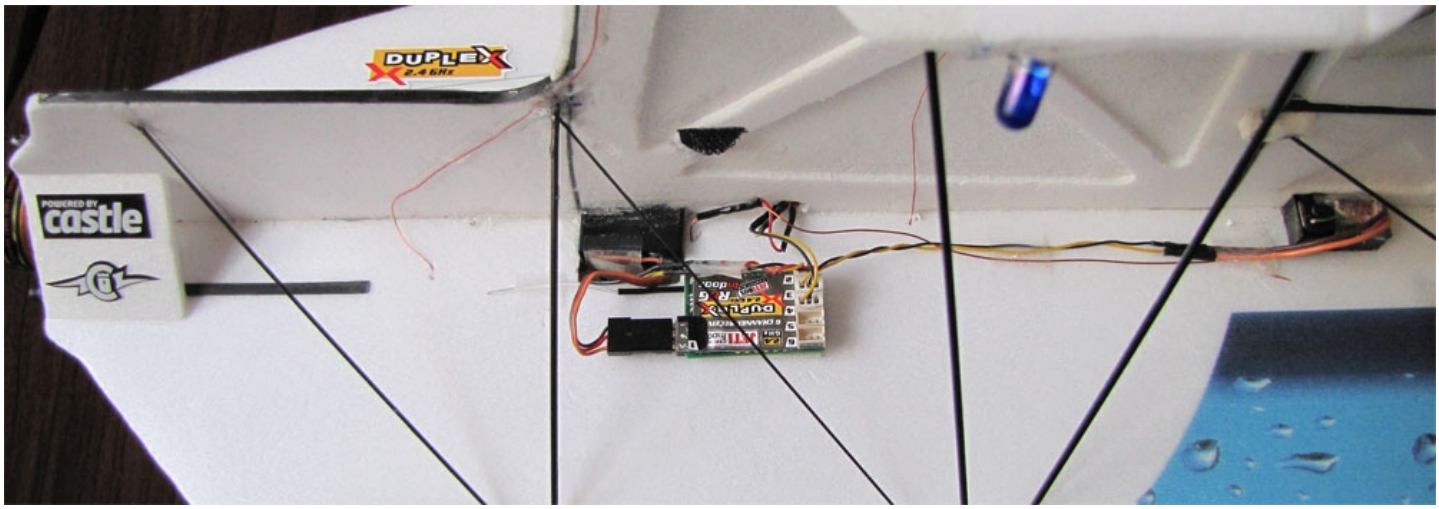


Example of motor mount for AXI 2203/40 (for VPP flying). Square area under motor is made for pitch servo. I recommend Hitec 5035 for pitch control.

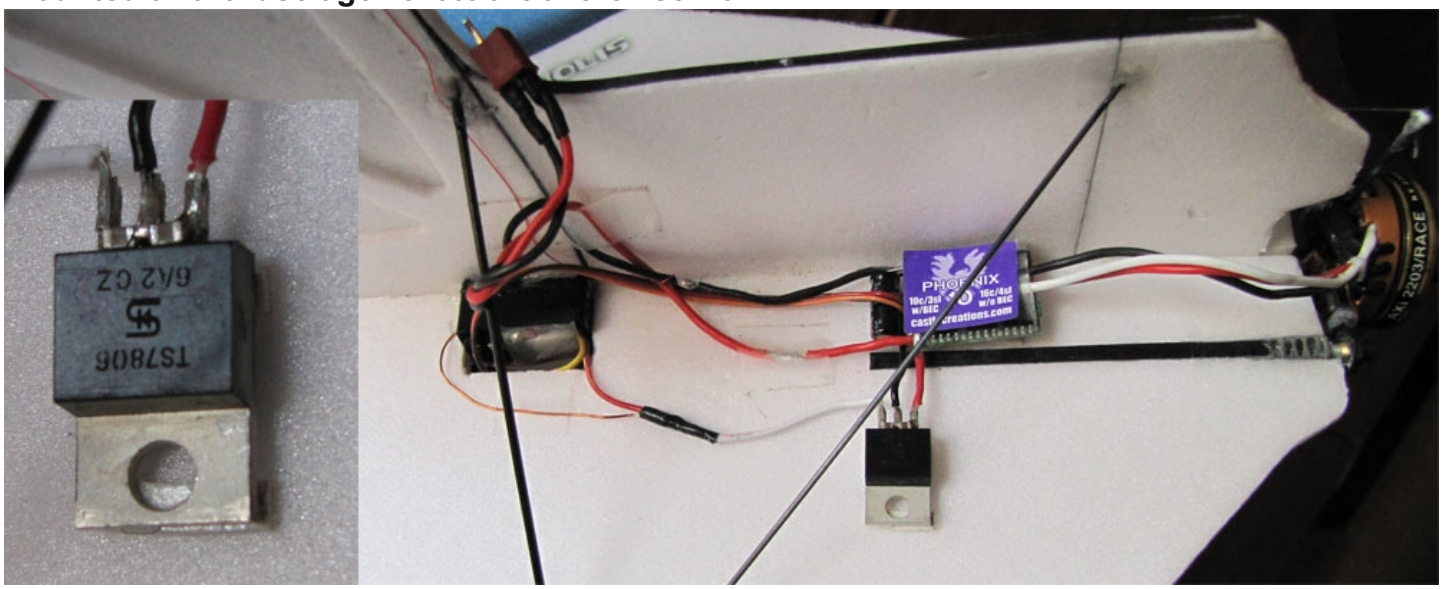
In pictures below you can see two options how to make landing gear. The first option is the easiest. Use pre-assembled gear legs and wheels that come in the kit. I prefer to use depron wheel pants reinforced with fiberglass plates because they are lighter and look better in the air. If you use depron wheel pants, don't forget to glue piece (3 mm x 20 mm) of soft Velcro on bottom of wheel pant. This will reduce noise and make landings a bit softer.







Assembly of model is almost done, now its time to place all equipment. This last step is very important in order to set the correct center of gravity. My competition *Arrow V.5* CG is 23.8 cm from the motor mount, and 11 cm from the wing leading edge. I place all equipment as close as possible to the C.G. In the picture above you can see the Jeti Duplex R6G indoor receiver mounted on the fuselage next to the aileron servo.

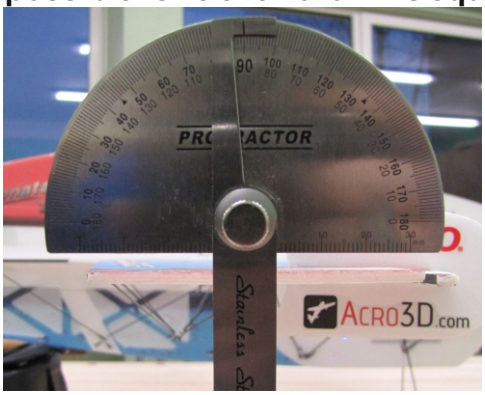


Here you can see the right side of fuselage with ESC mounted. NOTE! Wires can flex without tension, this is very important! It is a small homemade voltage regulator to supply 6 volts to all servos next to the ESC.

A small depron box is built to tightly fit the battery, which is mounted very closely to the aileron servo. The battery is held in place with a small piece of Velcro on the right side. Battery weight is 22.3g; such weight is very good for 35C 380 capacity.

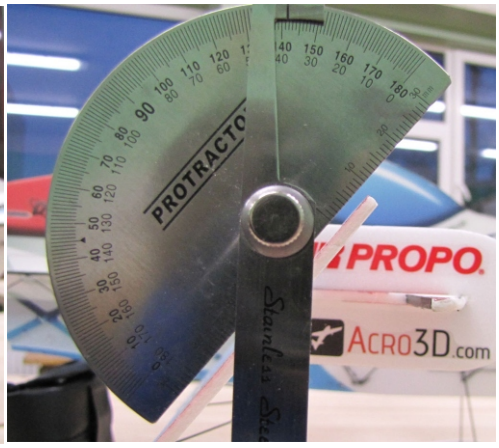
Final step in your plane assembly is the radio setup. Here you can see my personal settings on my JR9X radio. *Arrow V.5* is very easy and neutral flying airplane; therefore no mixes are necessary. I just put throttle curve to 90% to limit amp draw, which is necessary since I use a slightly larger propeller (GWS 8x4.3) than AXI recommends for the AXI2203/Race motor. Final step in your plane assembly is radio setup. Here you can see my personal setting on my JR9X radio. Arrow V5 is very easy and neutral flying airplane, therefore no mixes are necessary. I just put thr curve to 90 percents, to limit amp draw. I have to do this because i use slightly to big propeller (GWS 8x4,3) than AXI recommends for AXI2203/Race motor.

After having done our best to build the plane straight and strong, now its time to use a feature of the radio that will help the plane fly precisely. Many pilots do not pay so much attention to trimming of the plane. Before each flight in competition I make a short flight to be sure the plane is flying straight and perfect. Since *Arrow V.5* surfaces are really big, it is very important to have very precise trims with small trim steps. Original radio setup is for 4 steps on each trim click, and this is too much for precise adjustments. Here you can see how I put trim step to the lowest number possible. One click of trim is equal to just one step in the servo arm movement.



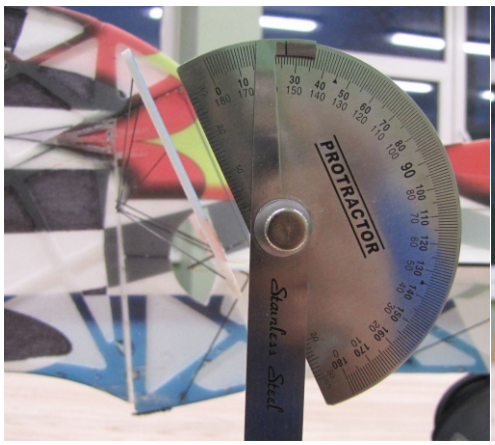
Aileron deflection. Hi rates, on my competition *Arrow V.5*.

56 degree up.

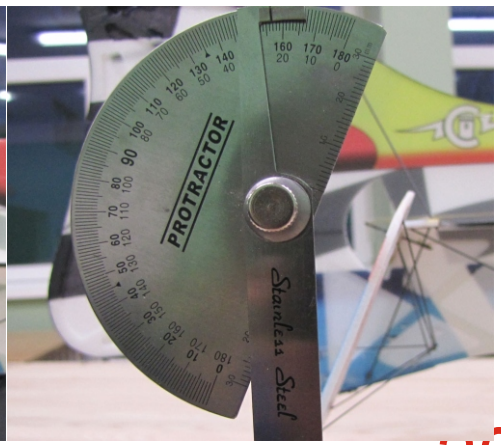


52 degree down.

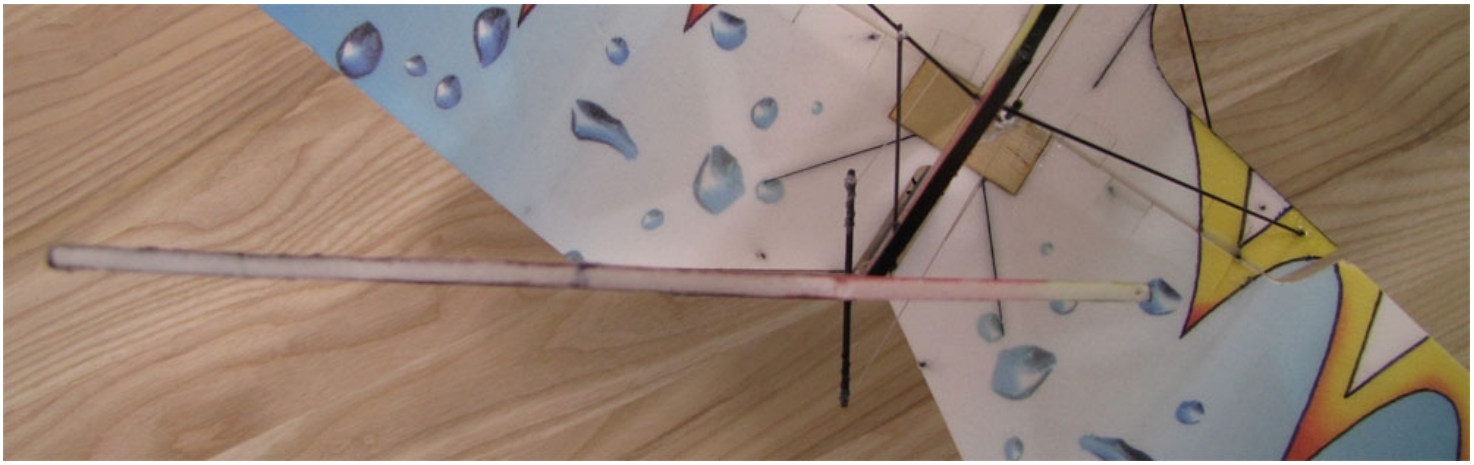
Elevator deflection. Hi rates, on my competition *Arrow V.5*.



64 degree up.



67 degree down.



Rudder must travel all the way from left to right inside cut out in the elevator.

Here you can see dual rate and exponential setup for all surfaces.

I use full deflection of all surfaces all the time, and therefore I prefer more expo. Two minutes competition aeromusical routines run very fast and there is no time for switching flight modes for different control surface deflections. However, when you fly for fun, it is quite interesting to set up low rates and fly the plane outside in light wind conditions. It is very interesting to see how agile plane like *Arrow V.5* can perform some IMAC/F3A types of flying. Most of computer radios allow you to set these modes really easily and I suggest exploring these options. Be always patient when you set up your control horns and servo arms; it is always better to use mechanical adjustments instead of radio settings to preserve the best resolution. To achieve this, please use exact same length servo arms and control horns as I recommend in this manual.

Once again, thank you very much for purchasing the Donatas Design *Arrow V.5.* I wish you many hours of fun flying with this model !!!

Please pay attention to safety when you fly this and any other RC model; planes can cause injury or damage to property or/and humans health if used improperly.

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