BG-MODELS designed by Gernot Bruckmann

INSTRUCTION MANUAL



Trivia 2.0

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TRIVIA 2.0 INTRODUCTION

Trivia 2.0 is a competition indoor model intended for modern F3P precision sequences and not for a beginner indoor pilot. We require that you already have experience in building F3P mylar planes. The new version is even further modified towards perfection in the AP-15 and the AF-15 sequences. It remains very good even at simple F3P sequences. The trivia 2.0 Prototype has been tested in the German Indoor Championship in November 2014 with a very good result and it was a really good answer to all carbon-mylar models.
Trivia 2.0 is a high-quality kit, made in the European Union. It is ready for competition right out of the box - no need to change a thing.
When developing the Trivia 2.0 we have invested heavily into drastic weight reduction, streamlining the build process and further refining the precision flying characteristics.

What's new:

- We developed special Ultralight 3mm Depron for our F3P models. The 2014 season really stressed the importance of the model's weight. This is our answer to the carbon-mylar models. The final weights of our Ultralight Depron models are more than competitive with anything our competition has to offer.
- Factory-made hinges. Hinging surfaces was one of the more tedious parts of the build in our previous models. It has been taken care of.
- Carbon hinge reinforcements – These give the hinges a boost around the control horn area. A major improvement in surface precision, especially after the models has seen many flights.
- A new method of reinforcing with carbon profiles – Quicker, simpler and more effective then anything previously seen.
- In all this news a special thanks to Alan Goljevcek from AlanRCFly

Thank you for choosing Trivia 2.0!

1. RECOMMENDED EQUIPMENT:

ENGINE: 10-13 gram engine. We highly recommend Glavak SG CRE 02 coaxial system, the kit is already prepared for this engine set up.
PROPELLER: Glavak 12" props for coaxial system are the best choose for this plane.
Glavak offers a wide range of carbon propellers. So try-out some different sizes and find your own choice.
ESC: YGE 7S
BEC: RH design micro BEC 8if you use a ESC without integrated BEC)
SERVOS:

- Ailerons: Hitec HS 5035 HD – pre-cut slots in the airframe
- Rudder and elevator: Spektrum A2010 – pre-cut slots in the airframe

RECEIVER: JETI RX7 nano or the lightest one for your transmitter

It is recommended to choose quality equipment for this model. It is perhaps the MOST IMPORTANT to choose precise servos. This has a significant and observable impact on flight. The equipment should also be as light as possible.

2. KIT CONTENTS:

- High-quality UV-printed, CNC laser cut parts from Ultralight Depron 3mm already covered with 3 micron Mylar.
- High quality light DPP CFK rods, tubes and profiles (3m 0,28mm rod, 12m 0,5mm rod, 4m 0,7mm rod, 1m 1mm tube, 0,1m 1,5mm rod 3m 3x0,13mm)
- CFK-parts – servo horns, control surface horns
- An additional piece of 3 micron mylar for reapairs or experimentation
- Pull-pull line
- 4x TREX ball links for ailerons linkages
- pieces of 3M BlenderM tape
- Kevlar thread for securing CFK horns on servo arms
- Piece of thin glass-cloth for reinforcement or repairs
- Detailed Instruction Manual

3. NOTES BEFORE BUILDING

Although building of the Trivia 2.0 is not overly complicated, it does require some time and effort. To achieve truly exceptional performance it is imperative that the model be built as straight as possible, light yet sufficiently robust. The most basic requirement is a flat and level working surface covered with wax paper (to prevent gluing parts to the surface). Before building make absolutely sure, by using a ruler or straightedge, that your desk in actually flat. Although not essential, a board with a cutout can make the build much easier. This board shall be described in the manual. Build at a comfortable place – precision really suffers when you are trying to rush through the build.
You should aim to use the minimum amount of glue possible – excess glue adds nothing but dead weight. Additional glue or reinforcement can always be added later, while removing it is nearly impossible.
Perhaps most important tip for a successful build is to follow the instruction manual to the point. The manual has been carefully written, based on years of experience. Try not to modify any of the building steps without a good reason for doing so. Some of your decisions may be irreversible. The instruction manual stresses the importance of keeping the build as light as possible. Any additional reinforcements add only a small amount of weight by itself. But a gram here and a gram there and things do add up. We have seen 7g of weight increase from only using excessive amounts of glue. While Trivia 2.0 wasn't designed to be crash resistant, its low weight minimizes the amount of damage seen in crashes. Additional reinforcements really don't help in this area. Glue is not included in the kit. It is strongly recommended to use THIN foam-friendly cyanoacrylate glue

(CA) – always with an activator/kicker. There is quite a difference between thick, medium or thin CA. Best results are achieved by using BSI Super Gold + BSI Accelerator. Use CA applicator tips for precise and controlled application of CA glue. UHU-por glue will also be used for hinging and reapplication of mylar in case of repairs.

Important health notice!
Glue vapor is harmful to your health. Make sure that you build in a well-ventilated area. Consider placing a small fan close to the building table.
When using glue, eye protection is mandatory. Remember a small mistake can result in serious eye damage.
Carbon dust should NOT be inhaled. Use dust protection when sanding carbon or gfk. Carefully vacuum the area when you are done building.

4.MISCELLANEOUS ITEMS REQUIRED FOR KIT COMPLETION:

- cables, connectors and insulated copper wire (Original servo wires should be replaced with copper wires)
- a sharp hobby knife,
- a drill (Dremel or similar) with 0,5 mm and 1 mm drill bits,
- a small file or sand paper on a block of wood,
- a ruler,
- a soldering iron,
- wax paper
- pliers,
- scissors &
- small files.

We highly recommend to use a transport box. Most of the damage happens during transport.

5.DISCLAIMER:

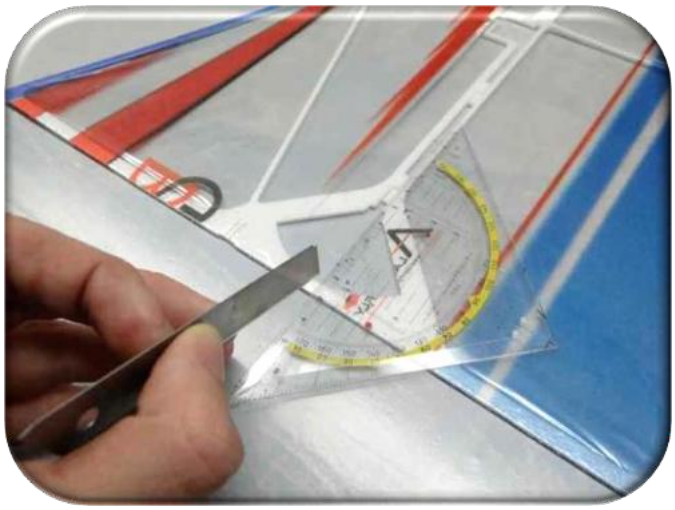
- The product is under warranty as long as the kit is untouched. All kits are inspected before being packed, but sometimes damage does occur during shipping. In such a case contact us by e-mail at gernot@modellbau-bruckmann.at
- We do not guarantee final weight, since it depends so much on how you build the model.
  The weight of the complete airframe (Depron parts only) is between 13 and 14 grams. With this it is possible to reach an even lower weight then our prototype.
- Due to the complexity of machining it is sometimes possible to notice certain asymmetries on the airframe. For example left side band of Depron is thicker then the equivalent right side band. In any case the outline of the model is never affected since it is cut in a single process. Minor asymmetries in the inside of the Depron parts are considered as cosmetic errors not affecting functionality and such kits are thus not liable for replacement.
- Holes in the mylar: Due to the complexity of machining micro holes in the mylar sometimes occur. Since they have no impact on performance we do not consider them a fault. Large holes in the mylar can happen

during shipping. In such a case the kit is liable for replacement, although we have not yet had such a case.

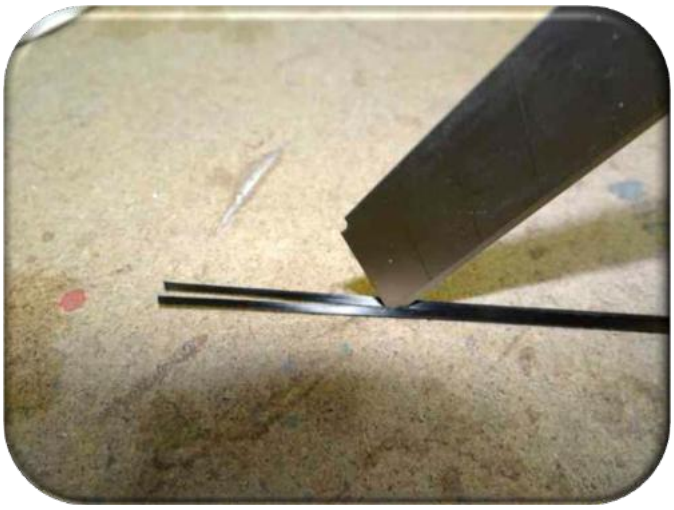
- It is very important to remove the Depron parts from their PVC bag with great care. Remove any sharp objects that may damage these parts from your working surface. We are not accountable in case of such damage occurring.

TRIVIA 2.0 – ASSEMBLY INSTRUCTIONS

1. INSTALLING CFK PROFILES

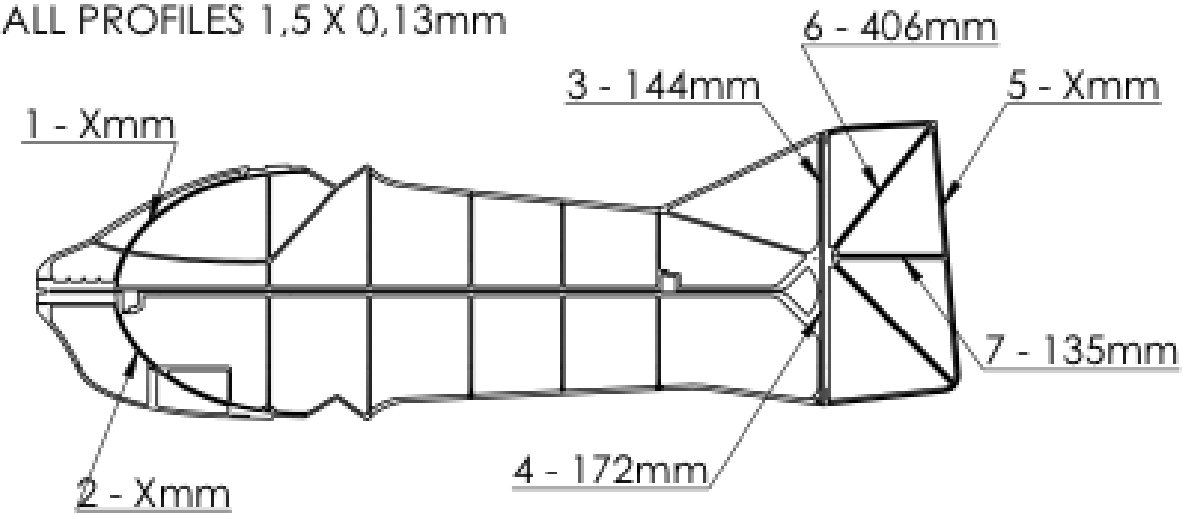


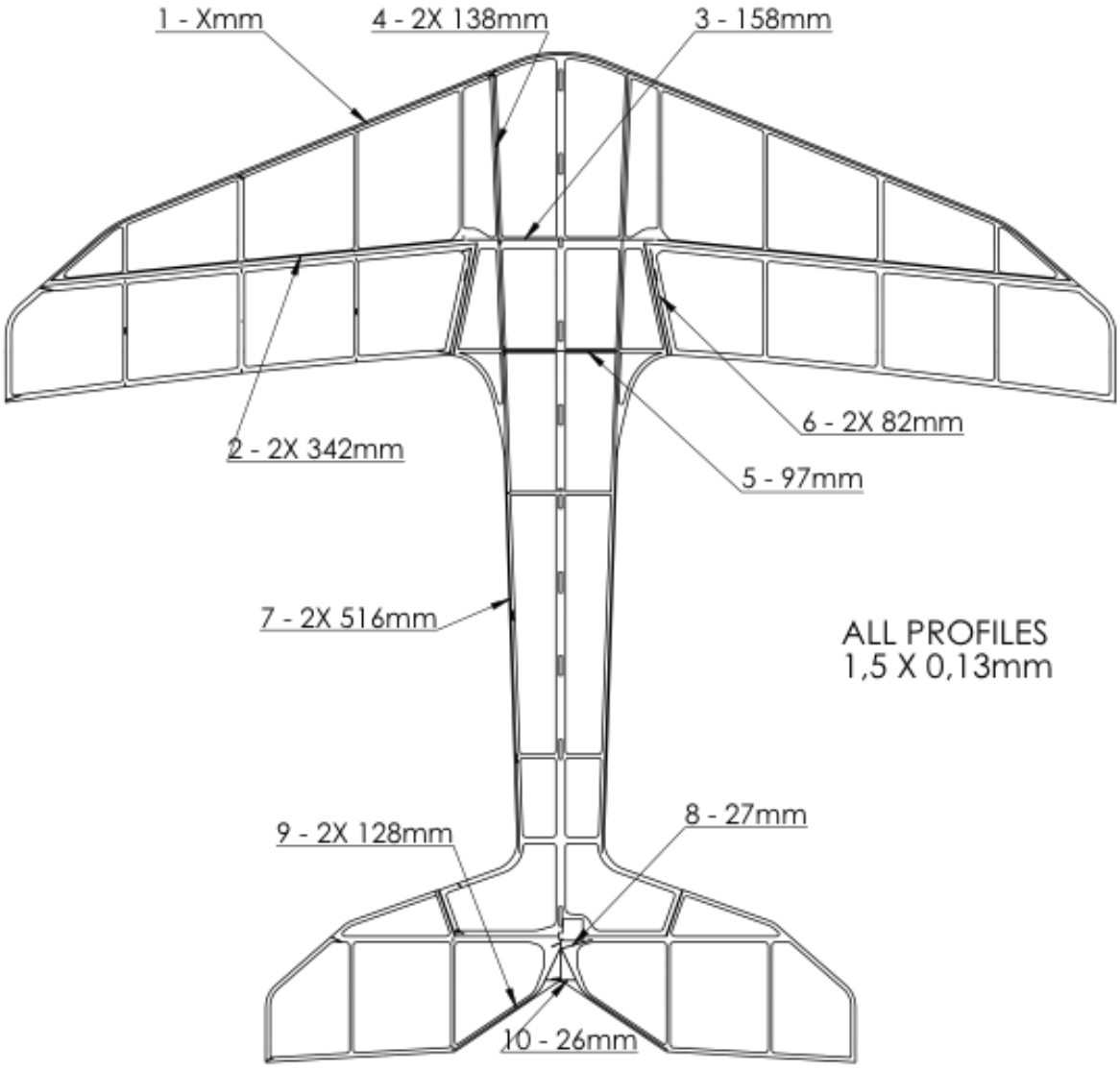
With a sharp knife split the fuselage in half



Split the 3x0,13mm carbon profiles in half lengthwise. Using only the half of the profiles saves weight and is more than adequate for strengthening the airframe. Best way to do it is using a sharp knife, try to be as as presice as possible but don´t worry, if it should happen that the profile is not split precisely through the middle in some places, it will not affect the reinforced part

ALL PROFILES 1,5 X 0,13mm

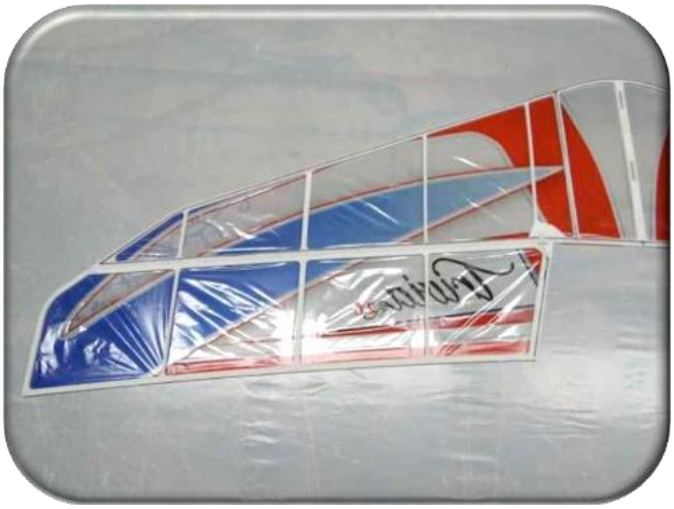


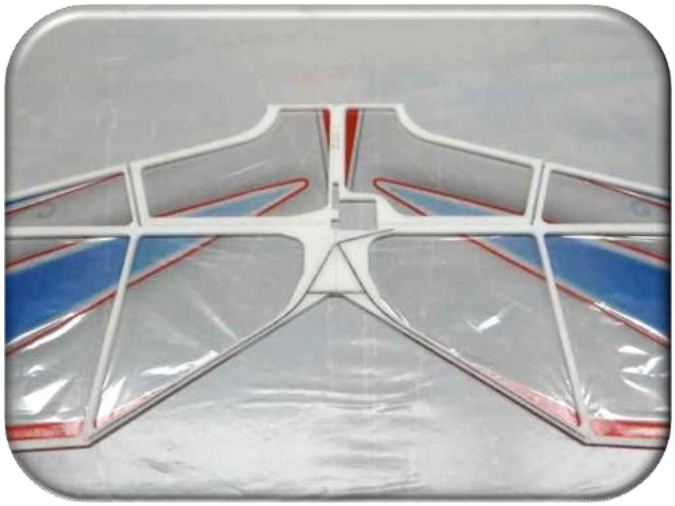


Notice that there are engraved lines in the Depron – these show you where to insert the carbon profiles. Deepen this lines with a sharp knife to about the half thickness of the Depron.

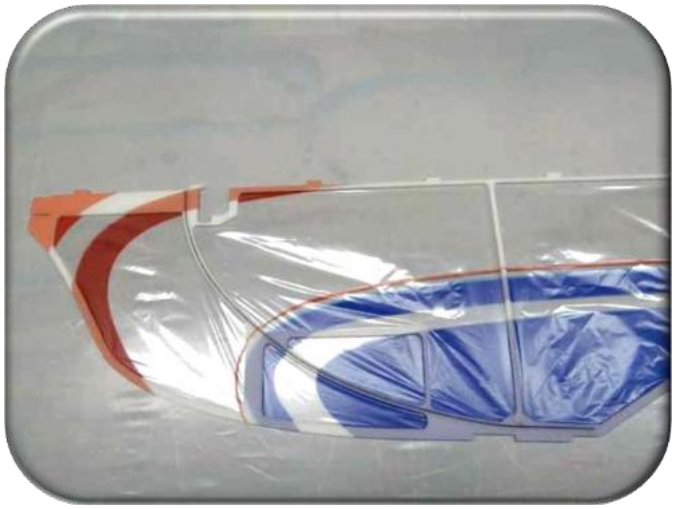


In the sketches you can find the right length and all positions for the 1,5x0,13mm carbon profiles.
For gluing the profiles use really thin CA, pay attention to the amount of glue you use. Place the airframe parts on a flat working surface and weight them down, this will prevent bending of the parts as you insert and glue the profile reinforcements.













The profile (3) on the fuselage has to be glued on the top first!

When you glue all the profiles, check the strength of each part. If you find a weak point add some additional glue to this place

2. REINFORRCEMENT OF THE NOSE SECTION

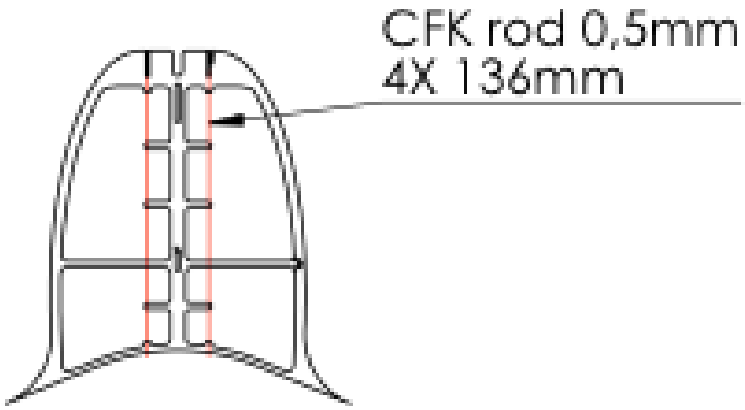
The slots in the nose section are intended for SG-Glavak motor´s attaching tubes. If you use the SG – CRE 02 coaxial system, you need to cut away some of the nose section. The cuts to be made are market with thin lines.



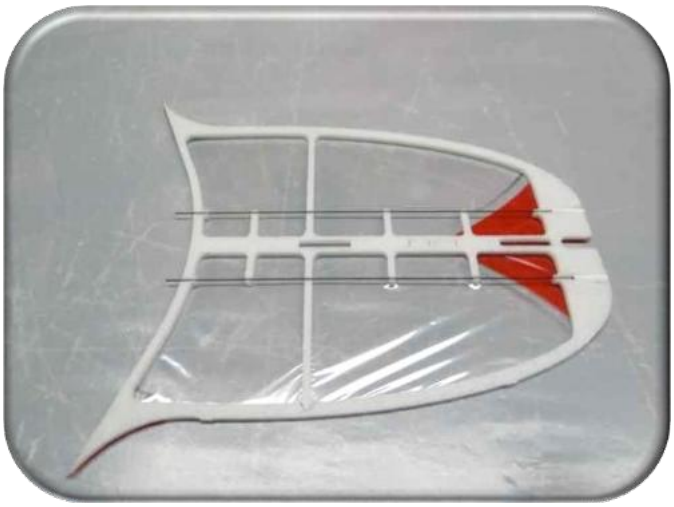


Cut the plastic tubes (are included with the Glavak motor) to the length of 12mm – don't cut away the end of the tube with the thread for motor screws.

Glue a 0,5mm carbon rod to the back of the plastic tube. 3mm of the rod should be inside the tube.

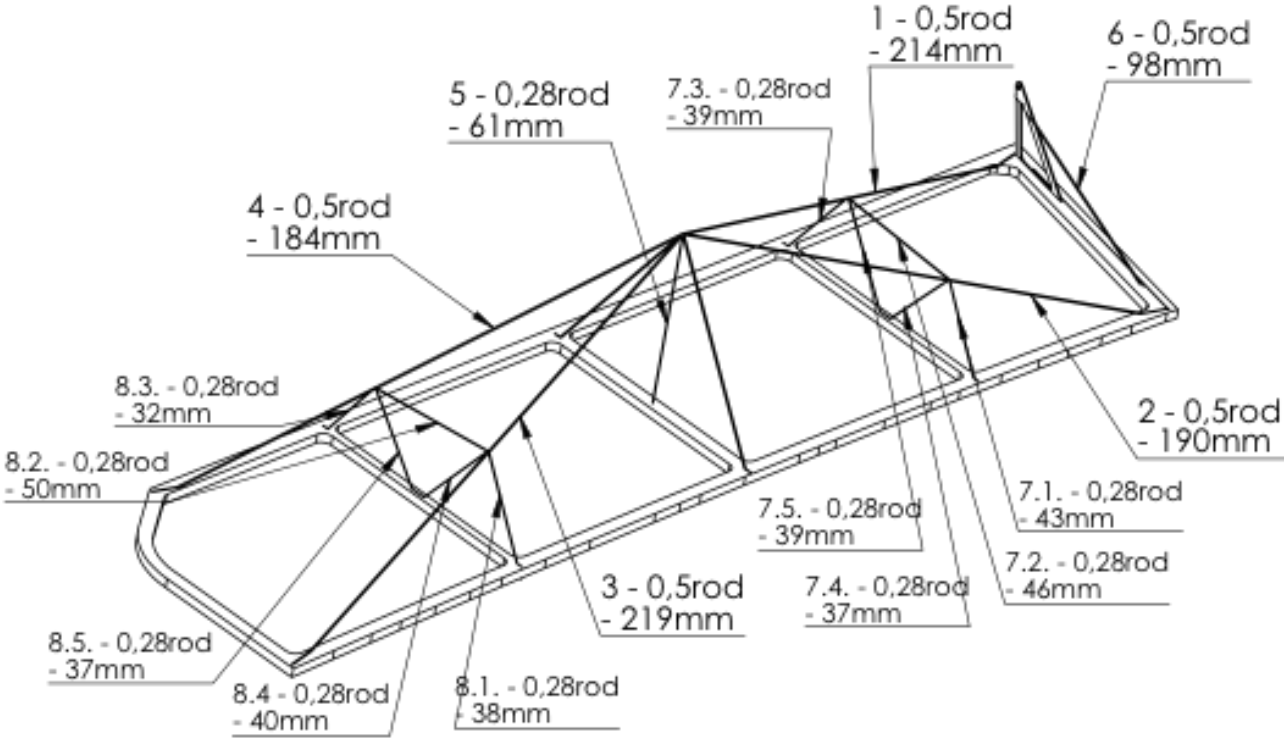


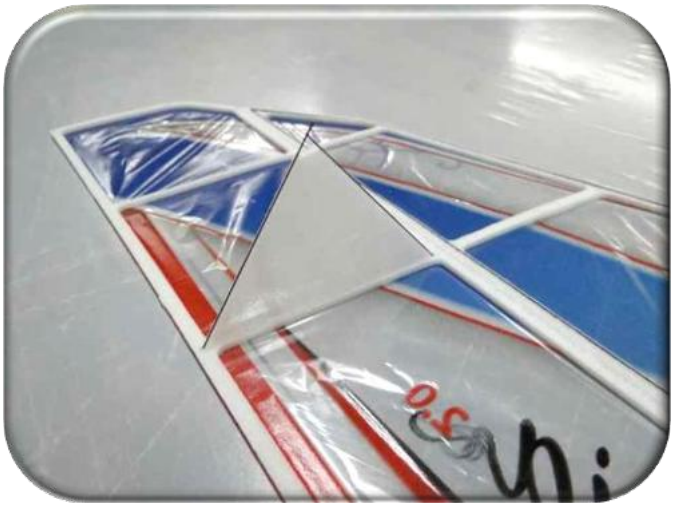
Glue the tube with ist carbon rod to the airframe. The carbon should be glued to all Depron parts which it goes through.





3. REINFORCEMENT OF THE AILERONS

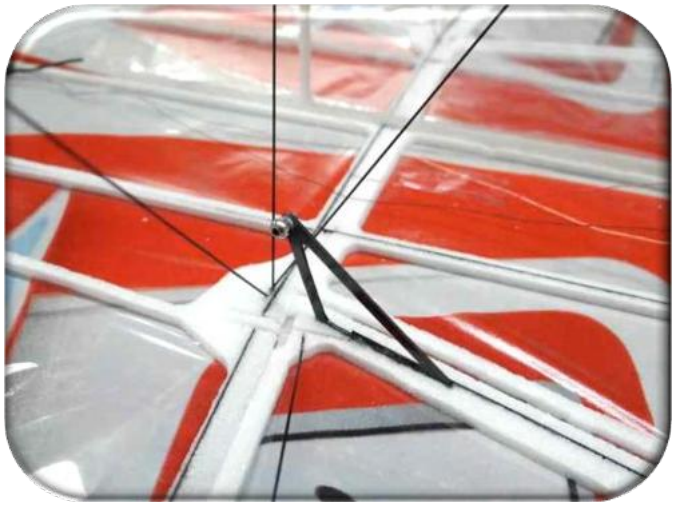






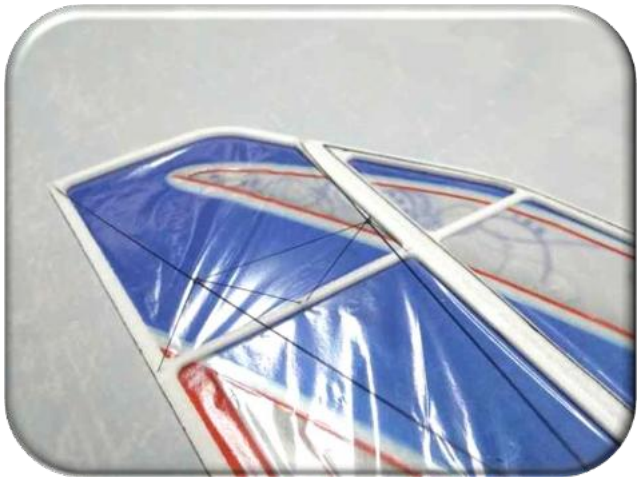
Take the Depron triangle template marked AIL position it on the aileron as shown and glue two 0.5rods.





Arrange the 4 0,5mm rods, glue them to the triangle first, then make sure that everything is straight and glue the ends to the Depron – use thin CA.
Glue the carbon control horn into the prepared slot, don't forget the steel ball and the 0,5mm rod reinforcement.



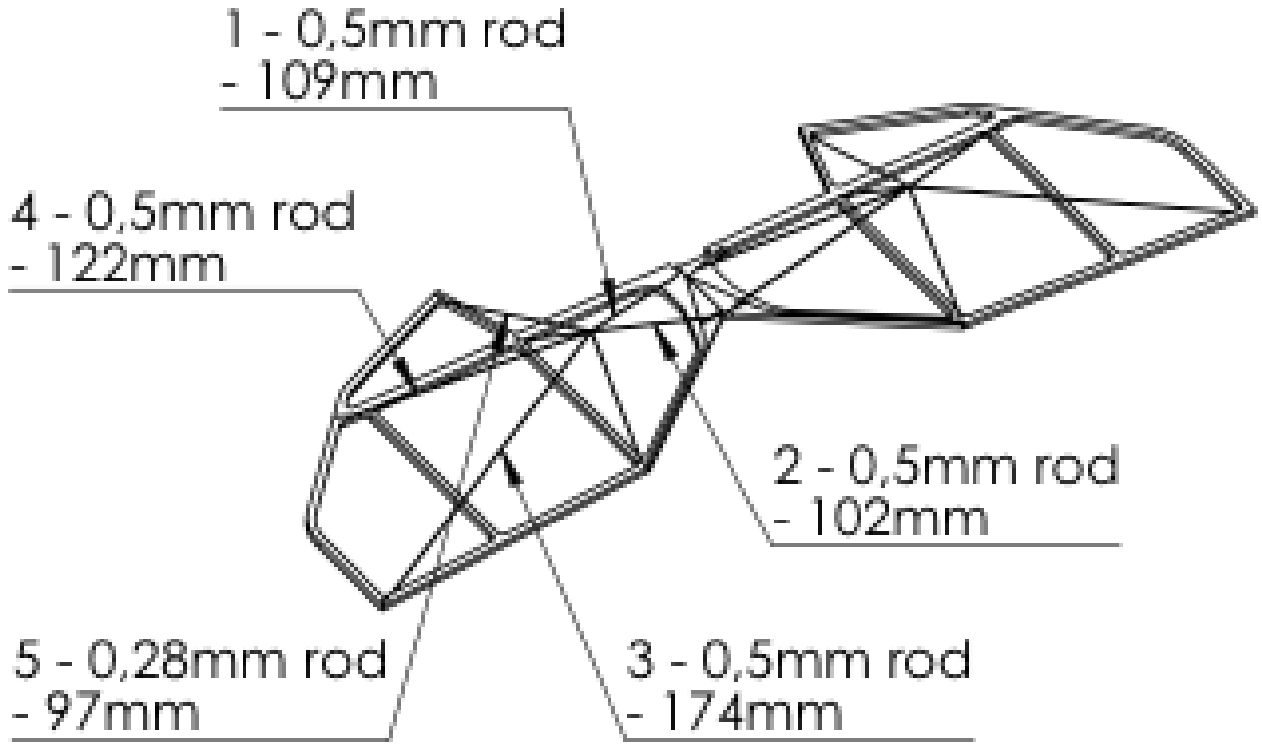


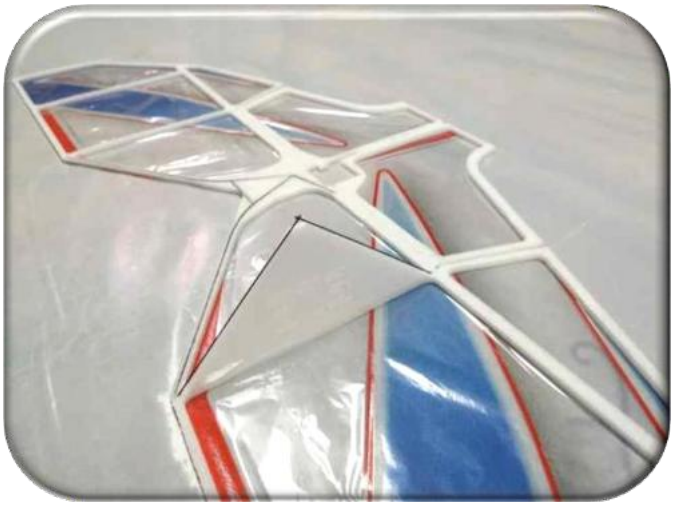
Once the basic structure is finished build the supporting structure out of 0,28mm carbon rods.

Repeat this process for the other aileron.

4. REINFORECING THE ELEVATOR

Use the same way then on the ailerons the reinforce the elevator







Take the Depron triangle marked ELE and glue the 2 0,5mm rods. Make sure that everything is straight and arrange the carbon rods as shown in the 3D sketch and glue them to the triangle and Depron.

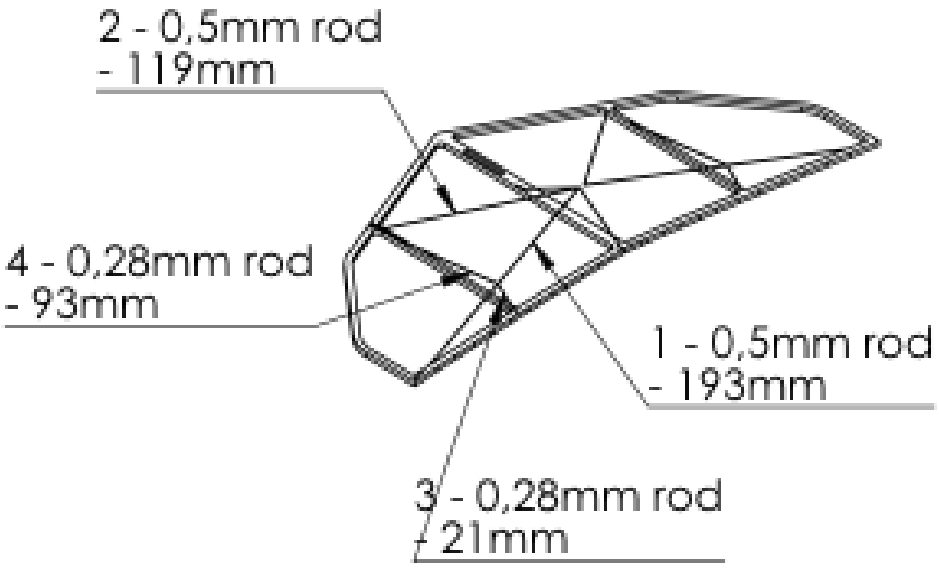
Repeat this progress for the second half of the elevator.





Position the aileron and elevator to the end of the table and bend it up and down a few times. To make sure that it can move easy.

5. REINFORECEMNT OF THE CANALIZERS



Use the same steps as on the ailerons and elevator to reinforce the 2 canalisers.

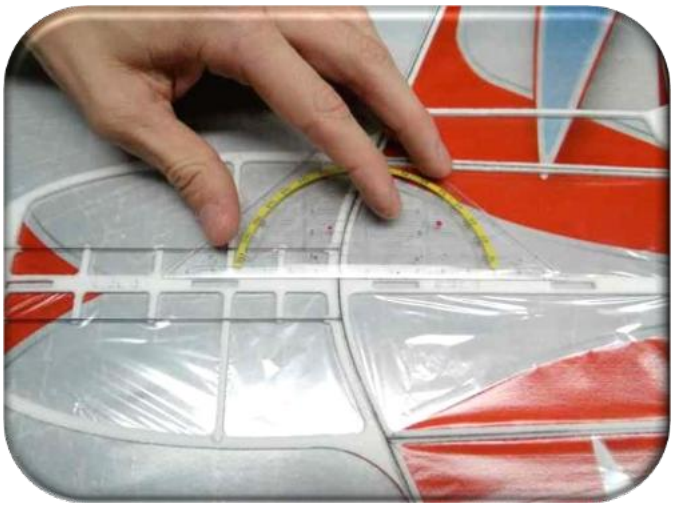




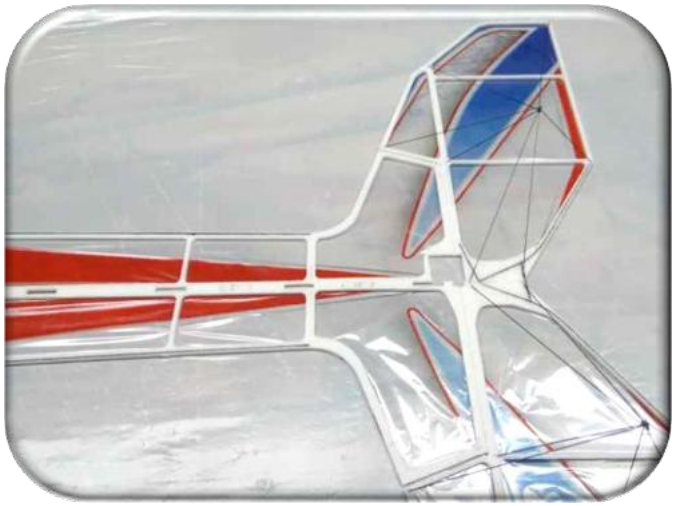


6. ASSEMBLY OF THE HORIZONTAL PART OF THE MODEL

Glue all the horizontal parts together. It is mandatory to check for straightness – help yourself with a long ruler

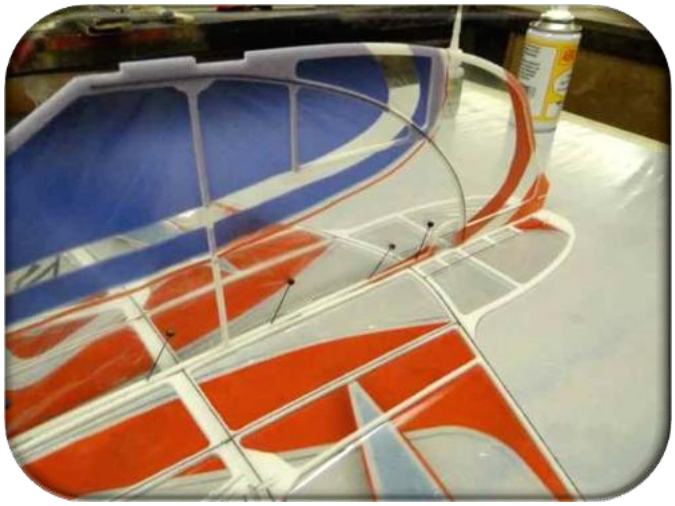


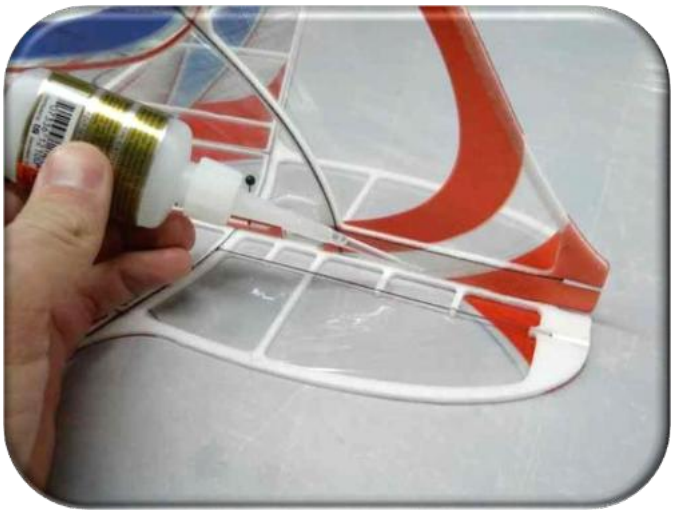




7. LOWER PART OF THE FUSELAGE



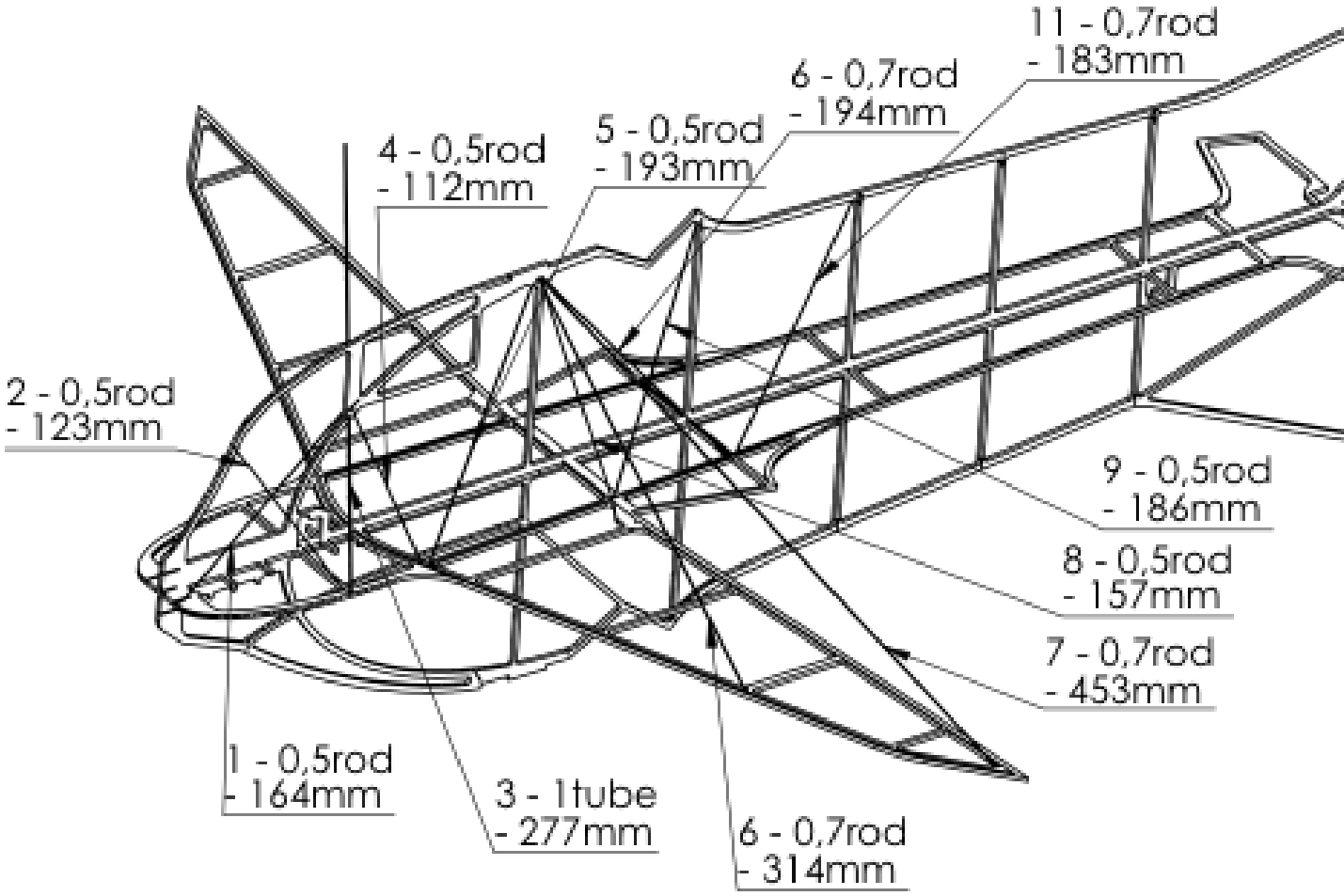


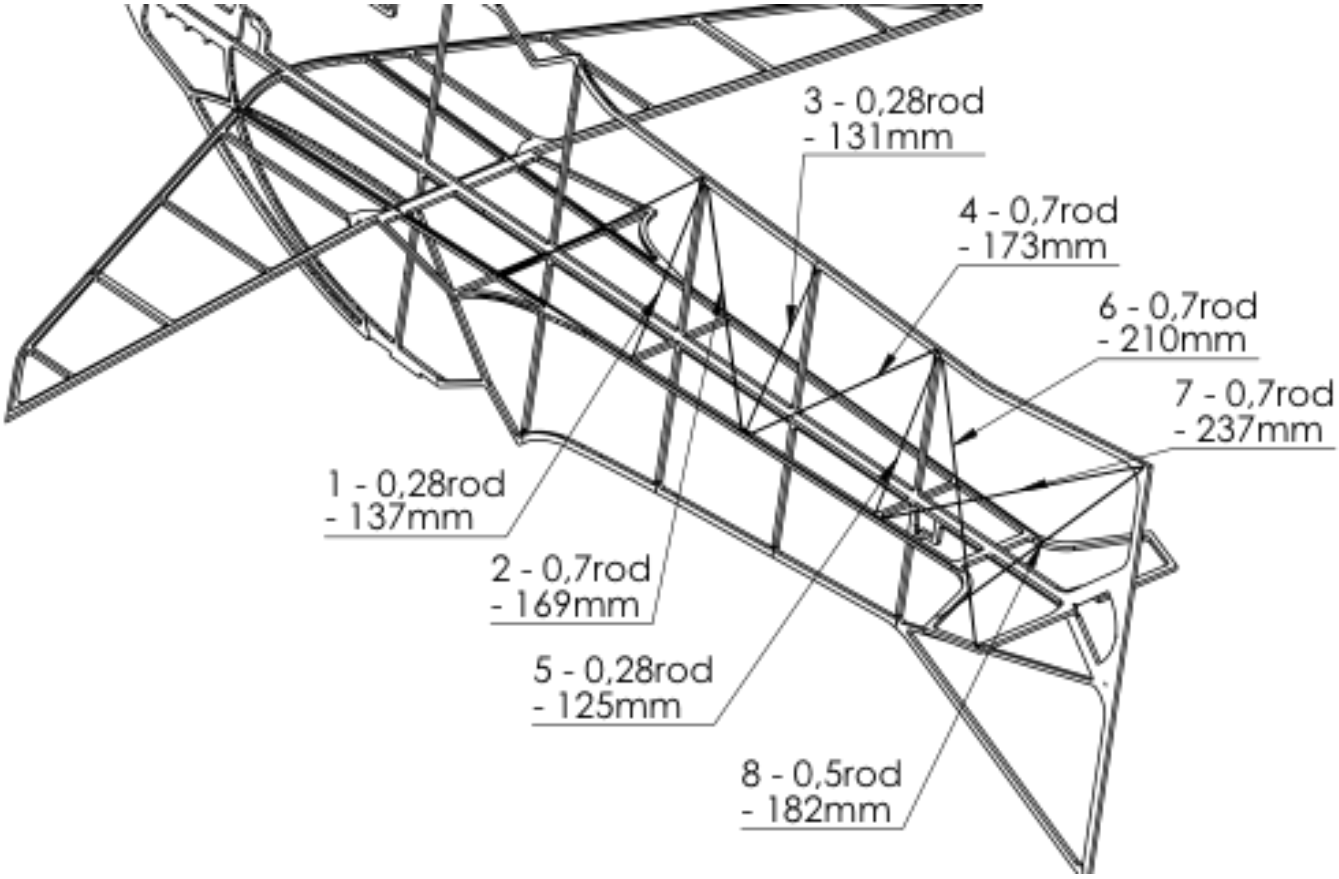


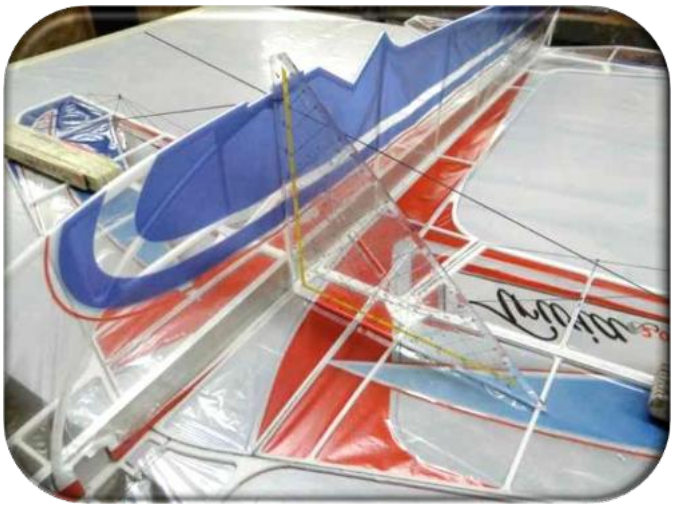
Check if the horizontal and the lower fuselage parts fit together nicely. If yes check that the horizontal part is lying flat on the table, then secure the lower fuselage with pins to the horizontal part and glue both with thin CA together.

8. REINFORECING THE LOWER SIDE OF THE FUSELAGE

Always check if the airplane is lying flat on the table and constantly check for straightness and vertical orientation

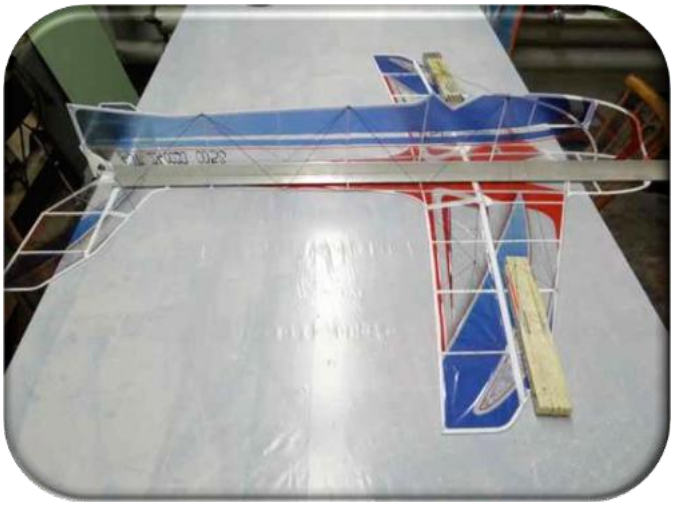








Start with the wing reinforcement – 0,7mm carbon rod – number 6 and 7





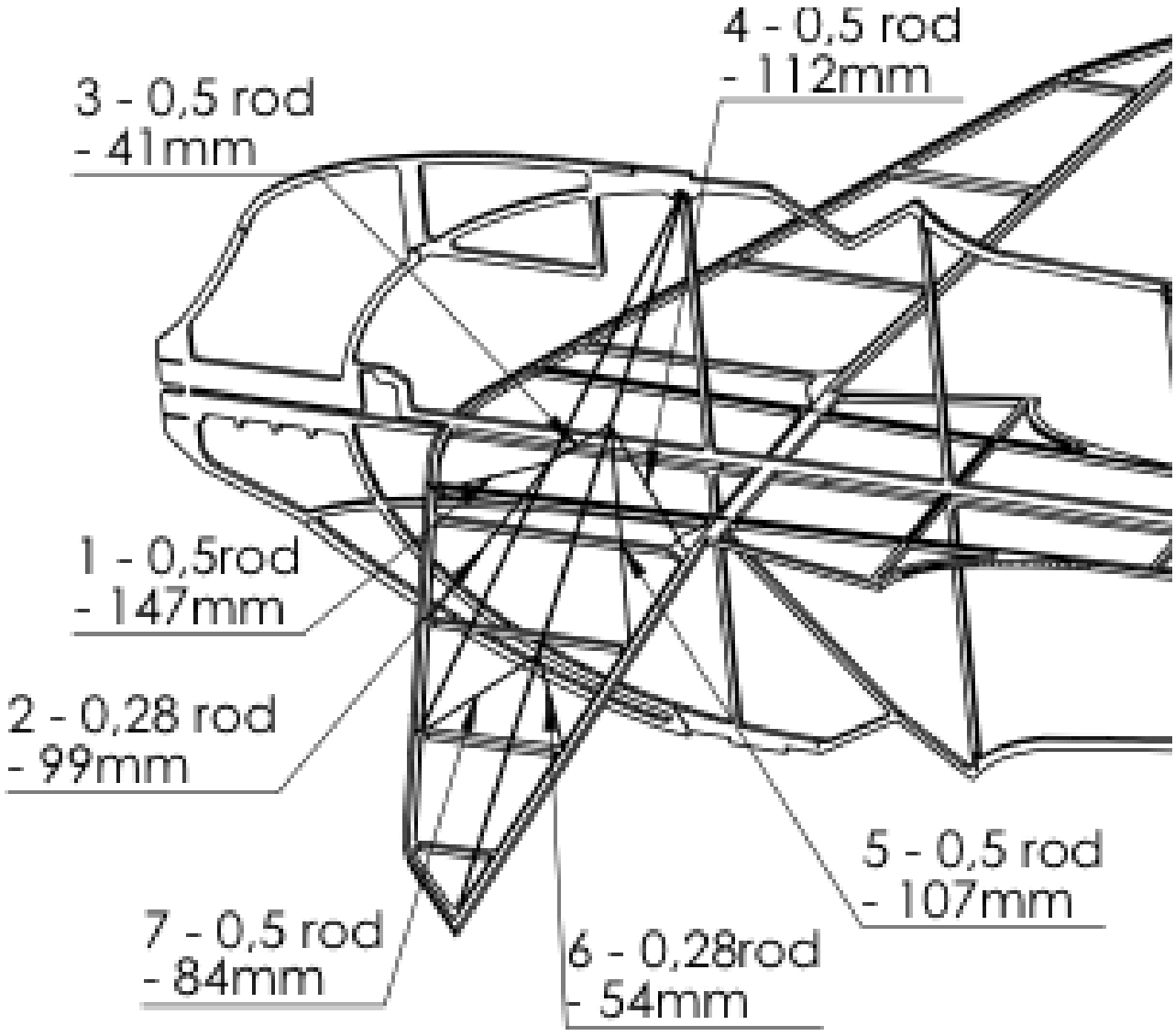
Go on with the main lower fuselage structure – 0,7mm carbon rods – number 6, 11 and 2, 4, 6, 7,





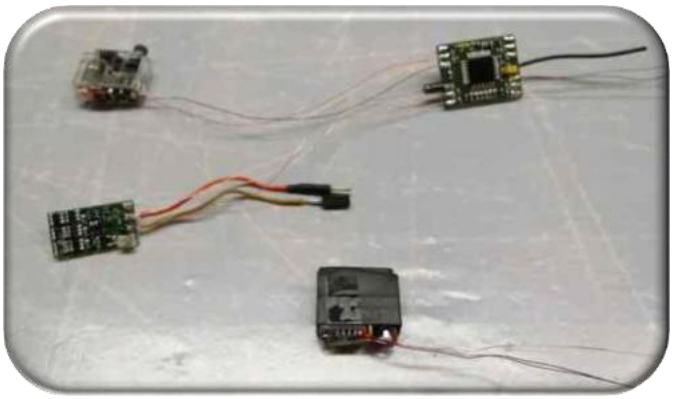
Next step is the nose section with 0.5 carbon rods – number 8, 5, 4, 2, 1

And the 0,28 carbon rods – number 1, 3, 5



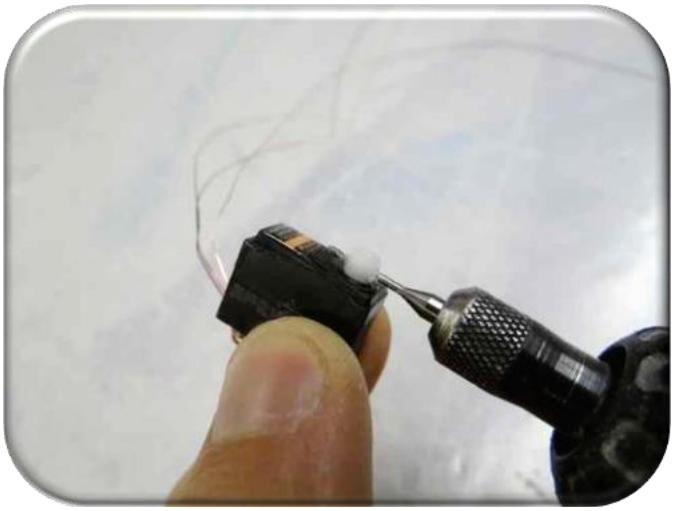
Further wing construction – use 0,5 carbon rod – number 1, 3, 4, 5, 7 and 0,28mm carbon rod – number 2, 6

9. EQUIPMENT PREPERATION



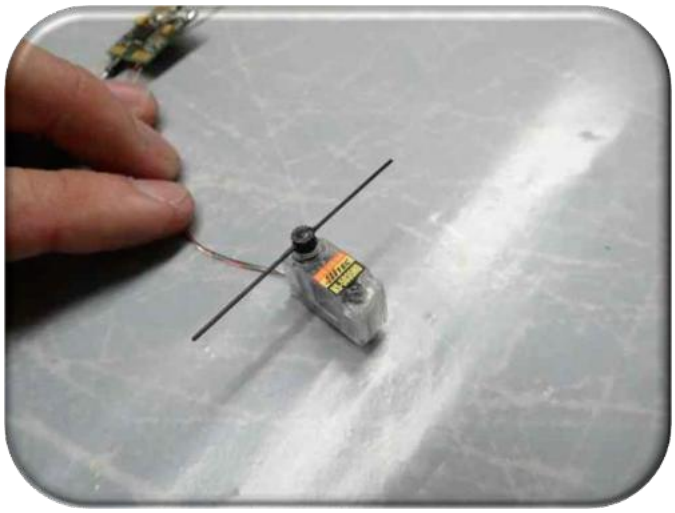
Prepare the equipment as far as possible before installing it. We recommend to use copper wire to replace the standard servo wires and to solder them directly to the receiver, this safe a few grams.

Prepare receiver, esc, bec, elevator and aileron servo and solder it together. Rudder servo and engine will follow later.





To safe even more weight we do not use servo arms, we drill a 1mm hole to the servo

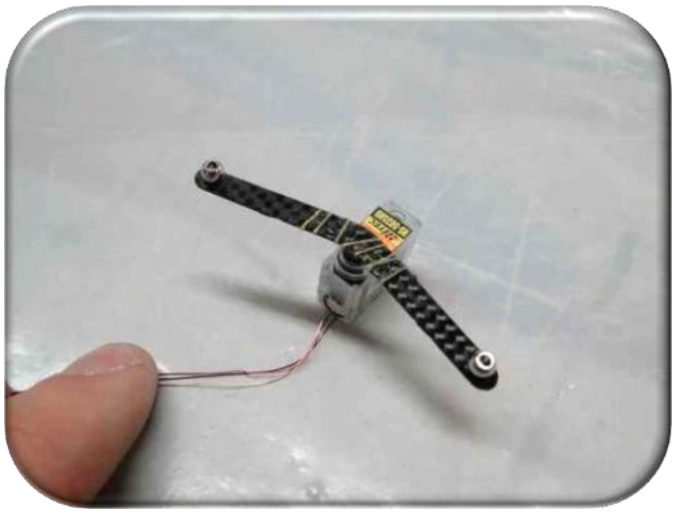


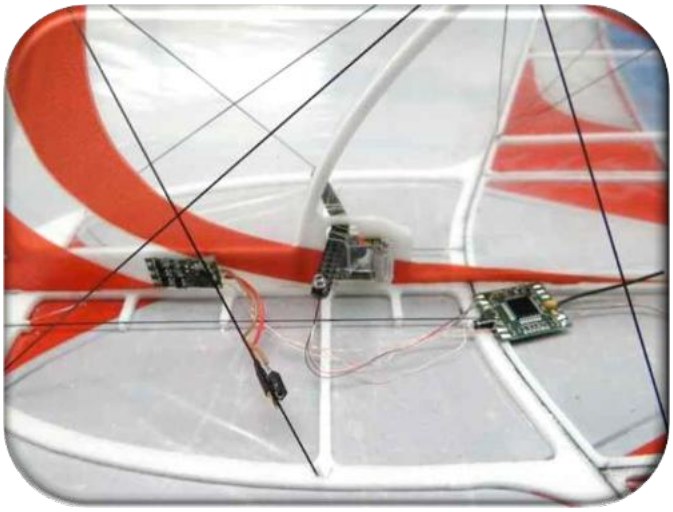
Then insert a 1,0mm carbon tube into the servo's output shaft hole.

- Aileron : 50mm (doesn't matter that much you can cut it later)
- Elevator 35mm
- Rudder 55mm

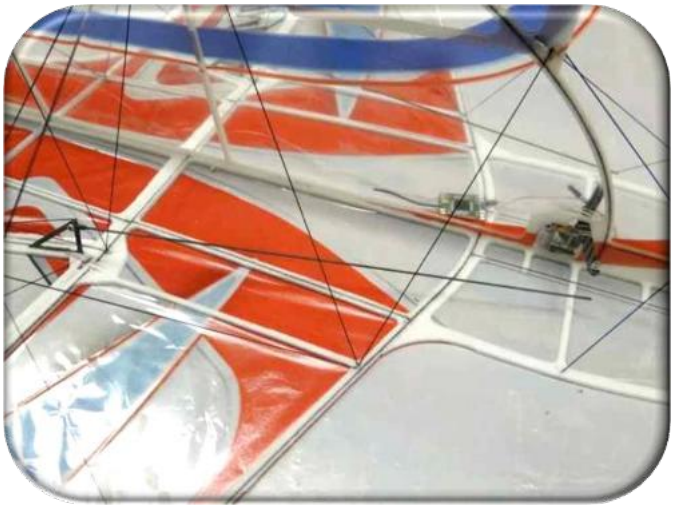
Be very carefully and use not to thin CA – it can easily happen that CA comes to the servo gear.
Be carefully that the servo is centered when you glue the carbon tube to it.

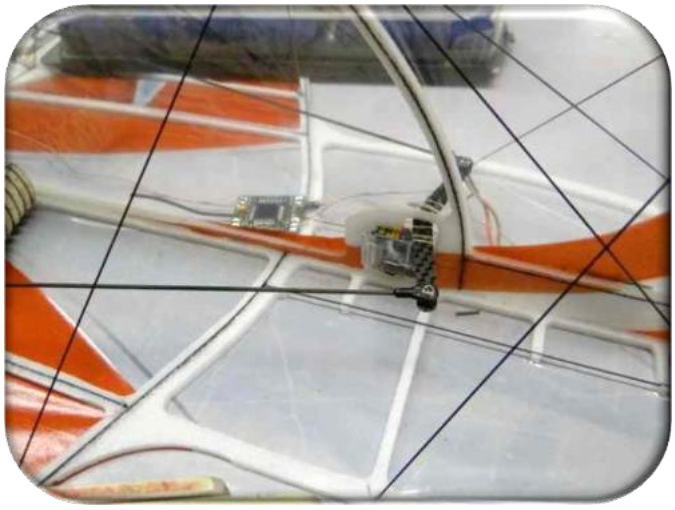
AILERON SERVO: Position the control arm so that the angle pointing forward once fitting to the model. Work really carefully that the carbon arm is really centered. Then wound the Kevlar thread around the servo arm and carbon rod to make it really strong. At the end glue 2 steel balls to the carbon arm



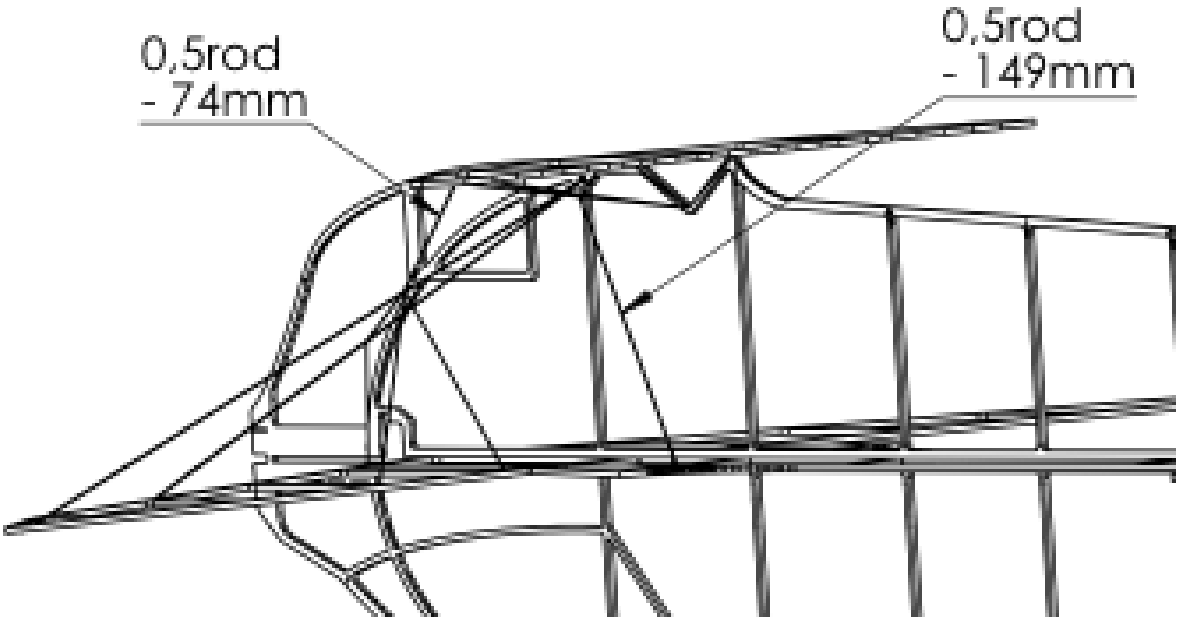


Place the esc, receiver and glue the aileron servo to the right slot.
Then go on with the aileron linkage. You need the 4 plastic parts from the TREX 250 ball links and the 1mm carbon tube. Work really carefully and double check that both ailerons are centered before gluing the carbon tube to the plastic parts. A exact aileron linkages is really important for a perfect flying characteristic.

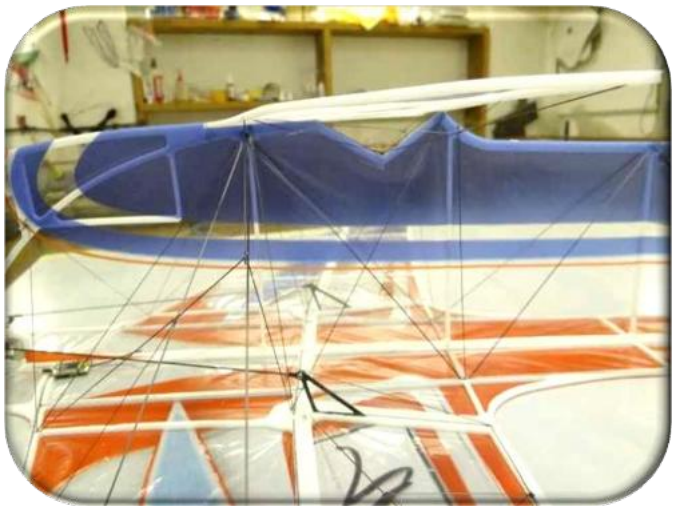




10. BOTTOM CANALIZER

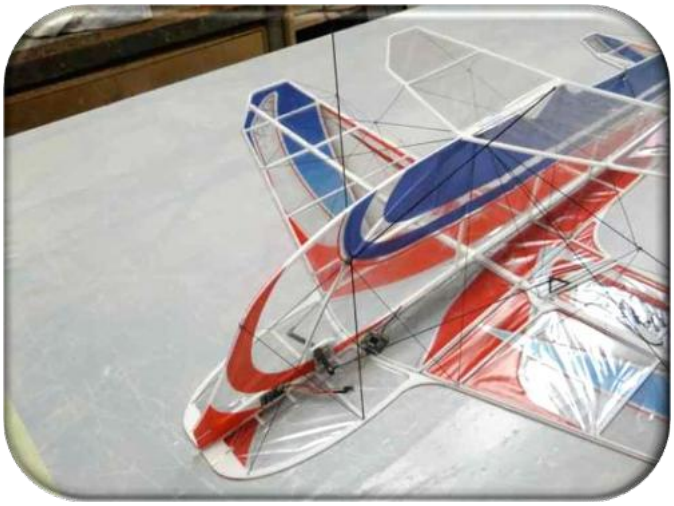
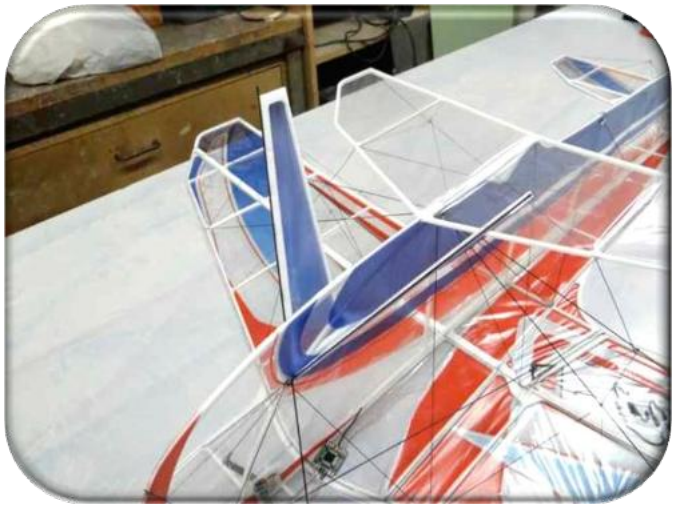




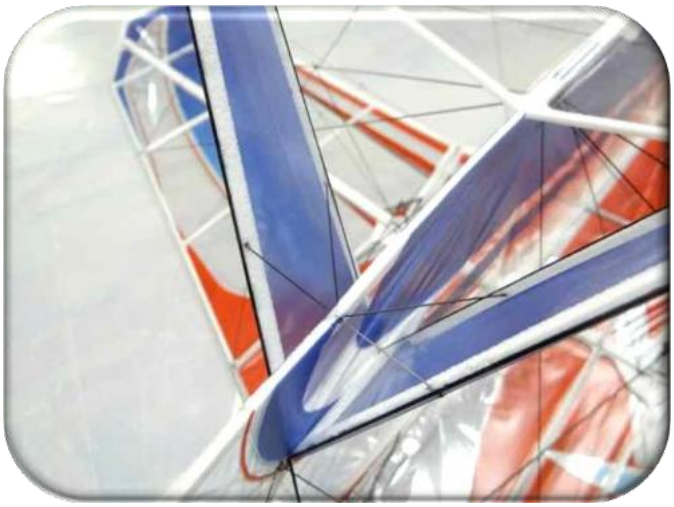
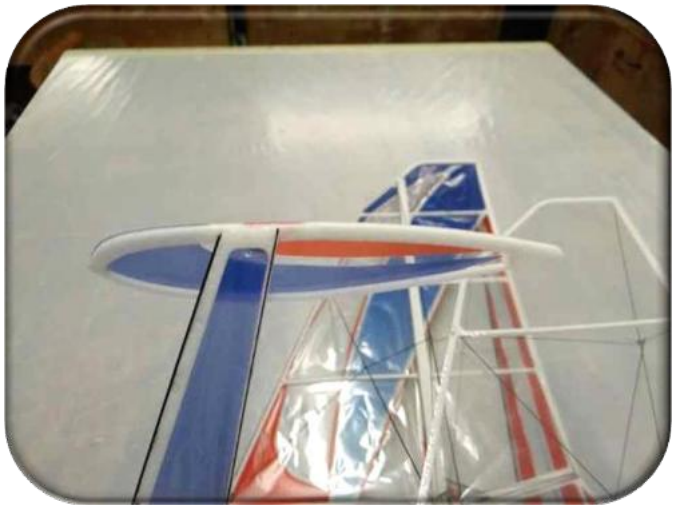


Glue the bottom canaliser to the fuselage – go on with the reinforcement, all is made of 0,5mm carbon rod – work carefully that the canaliser is really parallel to the wing, a good way is to measure it from the table.

11. LANDING GEAR

The main landing gear is made of a 1mm carbon tube, to make it look more beautiful cover it with the attached landing gear covers from Depron and Mylar – cut the edge to 45° first to make it fit to the fuselage perfectly.

To make the landing gear strong enough you have to reinforce it with 0,5mm carbon rods – see the picture above. The last step is to mount the wheel pants. Cut the edge of the landing gear covers to 45° to get a perfect fit with the wheel pants.

12. ELEVATOR SERVO

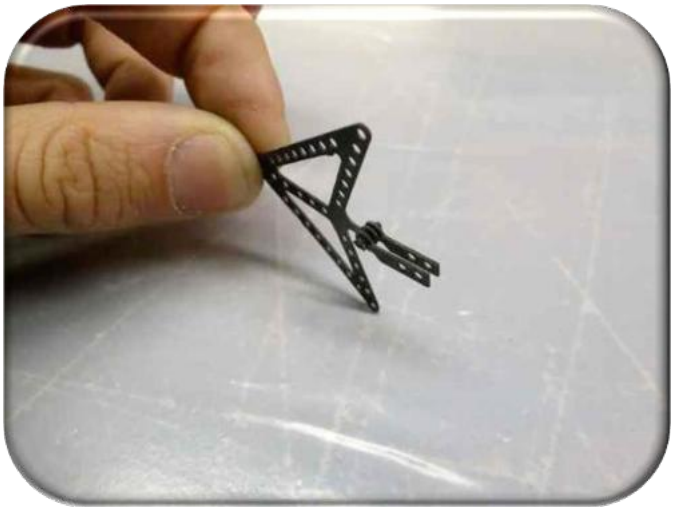


If the elevator servo is centered, glue it to its place.
Attention: the servo's pivot should be at the same height as the hinge line.
Then glue the elevator servo's carbon rod arm

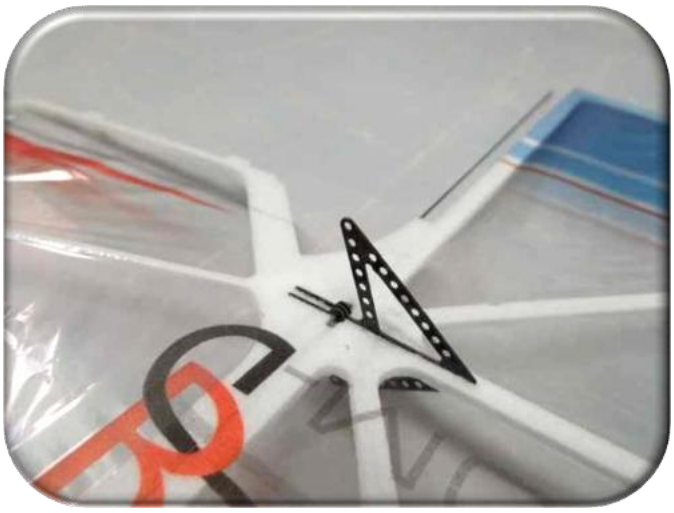
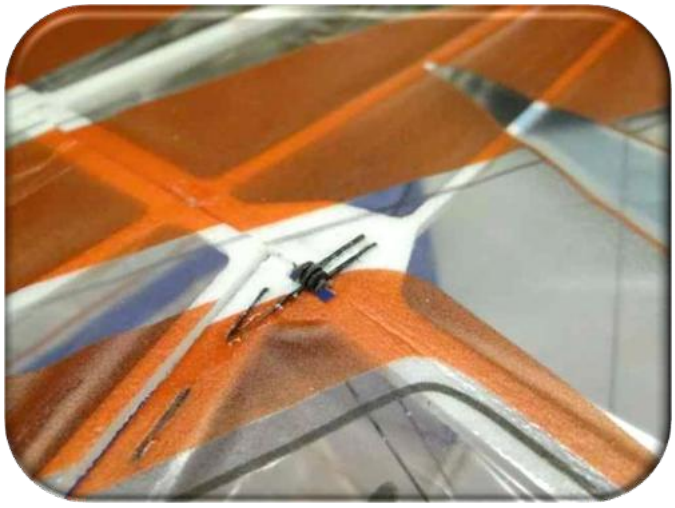
13. RUDDER AND HINGES



Next step is to hinge the rudder to the fuselage. The best way for this is to use UHU Por. Add a thin layer of glue to both sides and wait a few minutes, then put both parts to a flat table and move them together.
Now move the rudder a few times that you are sure that it moves easily.

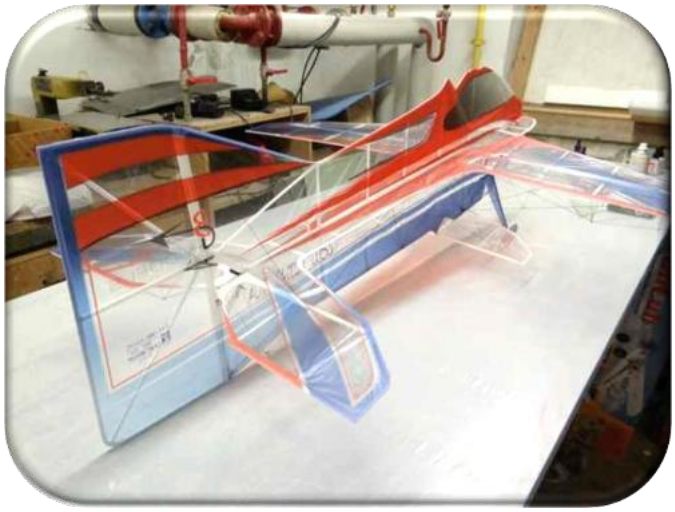



Prepare the carbon hinges. From a 1,5mm carbon rod cut 3 pieces of 8mm in length. Best way is to cut them at 15mm and then sand to the correct length.
2 on the one side and 1 in the middle pointing in the opposite direction – prepare 2 sets for the ailerons and with the rudder control horn for the rudder.

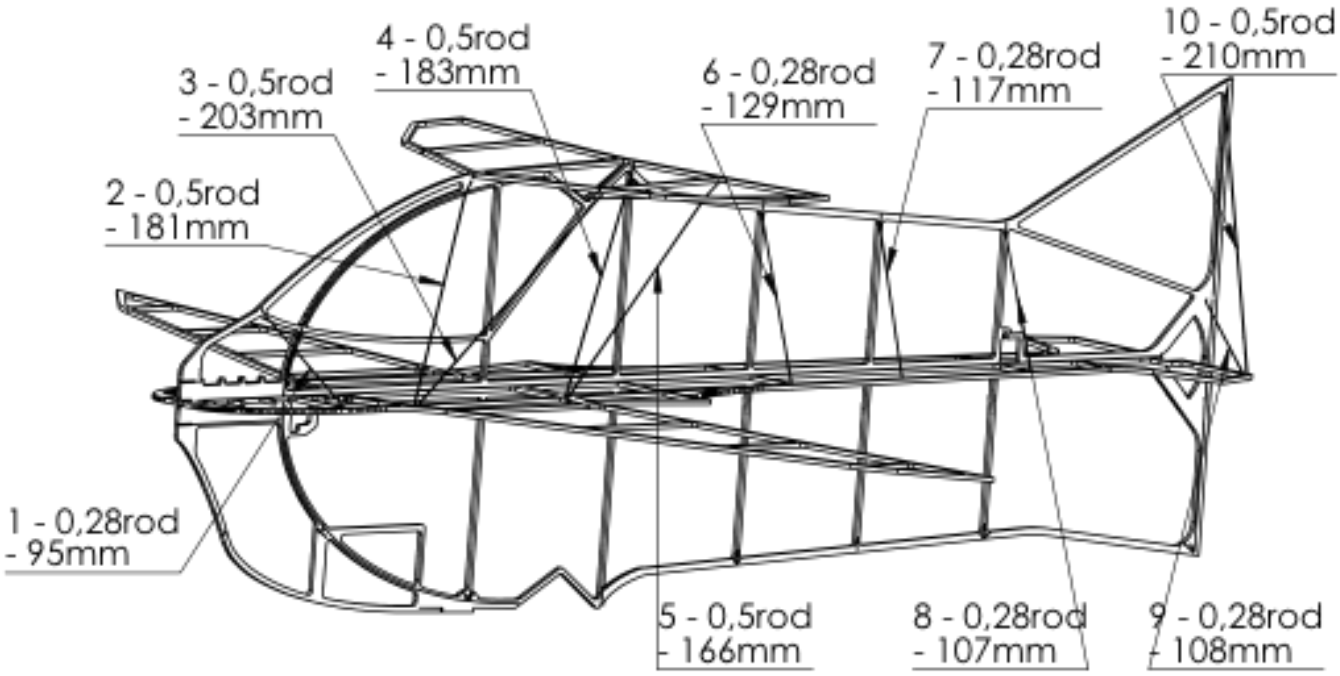



Check if the hinges and the rudder control horn fit the slots. If yes glue them with CA – be careful the surfaces should still move easily.

14. UPPER PART OF THE FUSELAGE

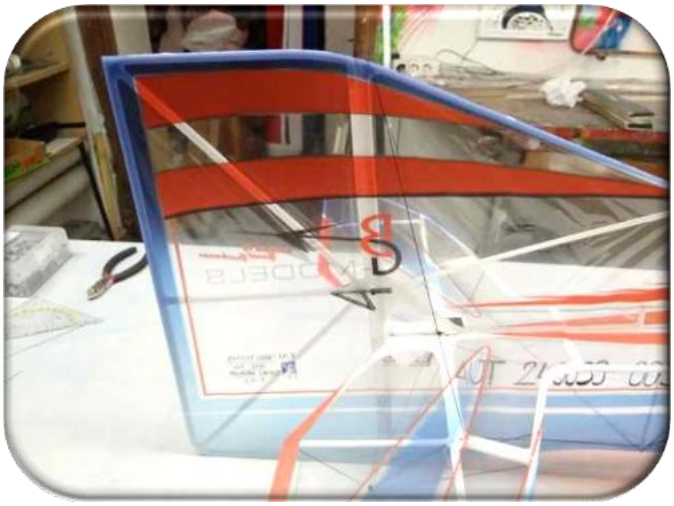


Now you can repeat the process of gluing the lower side fuselage. This will be a little bit more difficult because the plane is not on a flat table, so take your time and make it straight.
Position the upper fuselage to the model and secure it with pins and glue it.
If you glue the rear part of the fuselage don't forget to install the carbon profile to the slot in the lower part of the fuselage and glue it.



Reinforce the upper fuselage as you see it on the 3D sketch above.



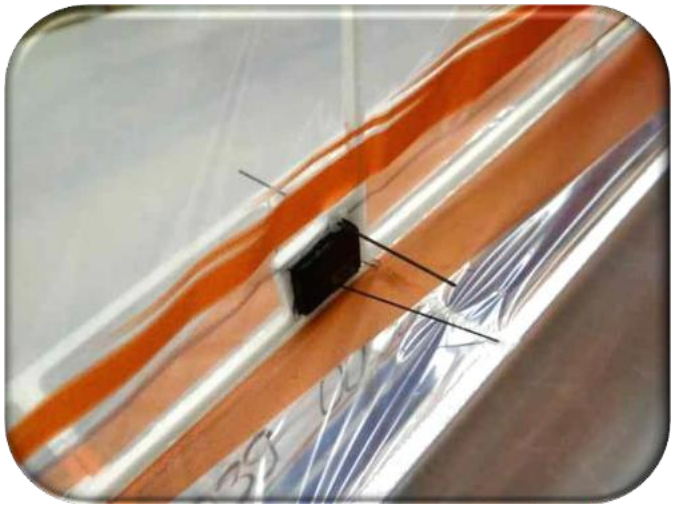


The rudder and the upper fuselage must be absolutely VERTICAL – so take your time and do it perfectly.
Bet way is to glue the carbon rods fist to the horizontal fuselage so the upper part can be still adjusted before gluing.



When the upper part is fully reinforced, glue the top canaliser to the fuselage and reinforce it.
Work carefully and adjust it that it is absolutely parallel to the wing.

15. RUDDER SERVO AND LINKAGE





Glue the rudder servo to its slot and reinforce it with 2x 0,5 carbon rods.
Run the copper wires to the receiver and solder them to the receiver – check the center position of the servo again.
Use the pull-pull line for the linkage – mount it first to the carbon rudder control arm. If the servo and the rudder is centered you can glue the line to the carbon rod servo arm – don't let any glue run down the pull-pull line, it has to be flexible at the servo arm joint.



To get the rudder linkage even more precise, we recommend to strengthen it with 6x 0,5mm carbon rods as shown in the picture left.

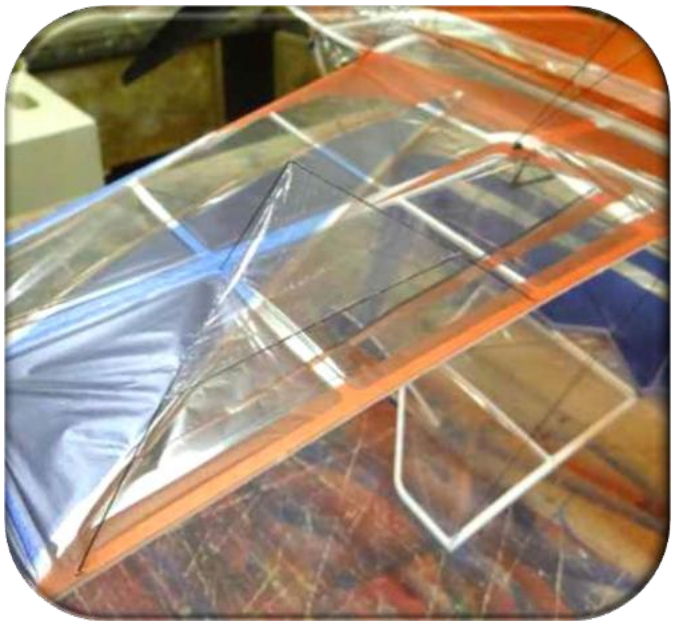
15. ENGINE

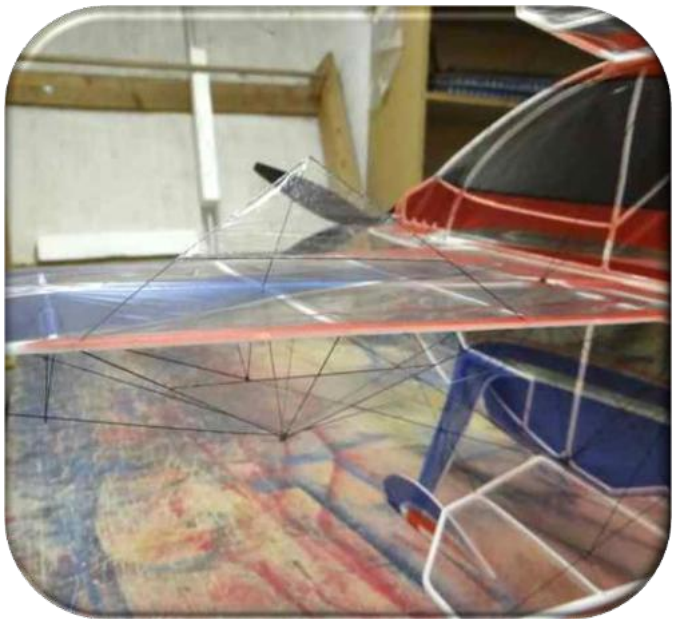


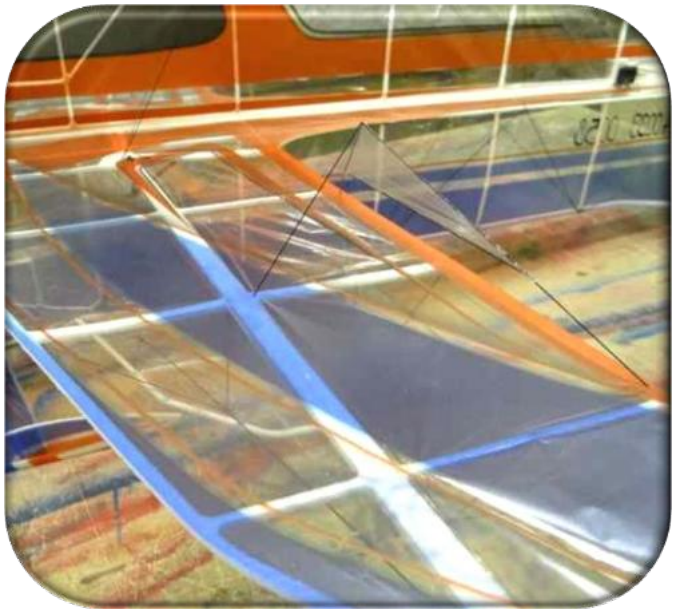
Screw the motor to its mounting tubes. Make sure to put the silicon separators between the tubes and the motor's mounting cross. Set to motor to 0 down and side thrust as good as possible – the final adjustment will be made in the first test flights.

16. STATIC AIRBRAKES

If you made the first test flights and the perfect set up and you think that your plane is to fast on down line, then we recommend static airbrakes on the ailerons. The best way is to use carbon triangles cover with mylar made of 0,5mm or 0,28mm carbon rods.
The size can various, it depends a lot on the engine set up and your propeller choice.







17. SETTINGS

- Take care when handling the model. You can safely held the plane directly in front of the top canaliser. If you hold the model in the wrong place you can actually damage it!
- From time to time, check if all reinforcements are still strong enough.
- Center of Gravity has to be at 280mm measured from the Depron nose – it is really important that your plane is not too tail heavy
- We recommend to use dual rate on rudder and elevator
    - 90% Elevator
    - 50% Rudder in normal flight and 100% for stall turns
- Do not use 0 Expo, we recommend
    - 40% Aileron
    - 30% Elevator
    - 20% Rudder in normal flight and 70% for the stall turns
- The Best way to set up the side thrust is in knife edge – if you need the same rudder on both knife edge direction your side thrust is good
- On the down thrust the best way is to check it on up and down line
- Keep in mind that no plane flies itself and that a good part of an aircrafts performance depends on the pilot!

All these are just Tips for your first flights, you may change all the settings after your hopefully successful first flights.

I wish you all the best and good flights with your new Trivia 2.0