ALIEN Assembly Instructions

V1.0

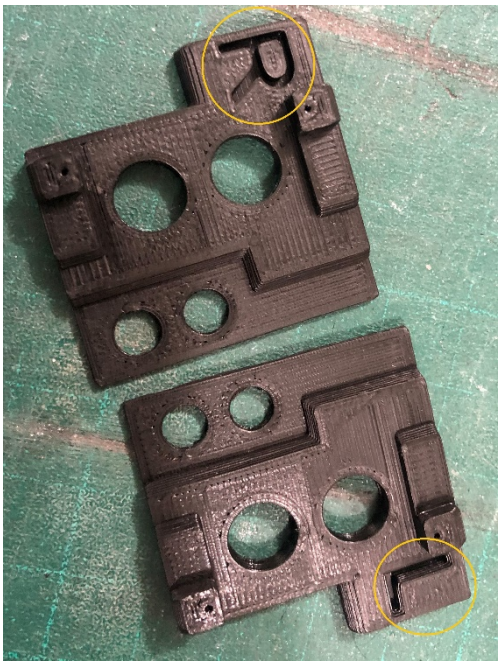
13 December 2021

Thank for the purchase of the ALIEN Flying wing. Despite the apparent simplicity of this glider please pay very special attention to the elevon control setup. Extreme precision is needed in the elevon controls to obtain the best from this model.

You will have the satisfaction during flight in proportion of the time spent ensuring accurate slop-free elevon movement. Please do not ignore this crucial advice. It is also important to set up the control movements as detailed on the last page of this manual.

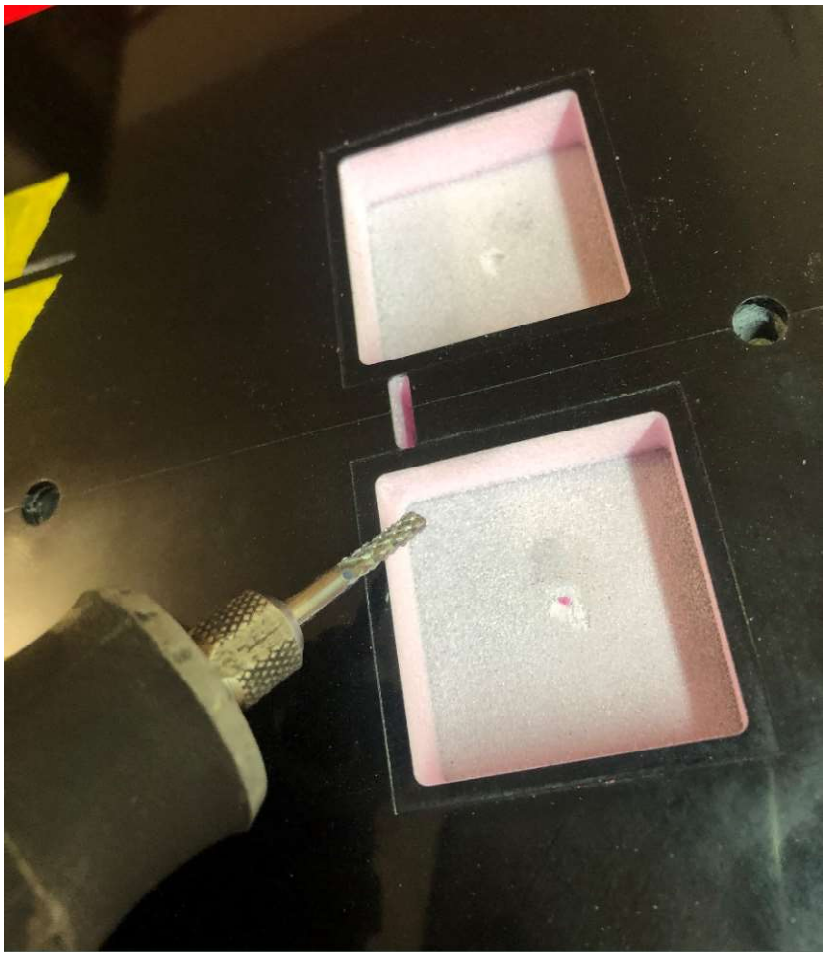
PLEASE READ ALL THE INTRUCTIONS BEFORE STARTING THE ASSEMBLY.

The assembly in pictures :



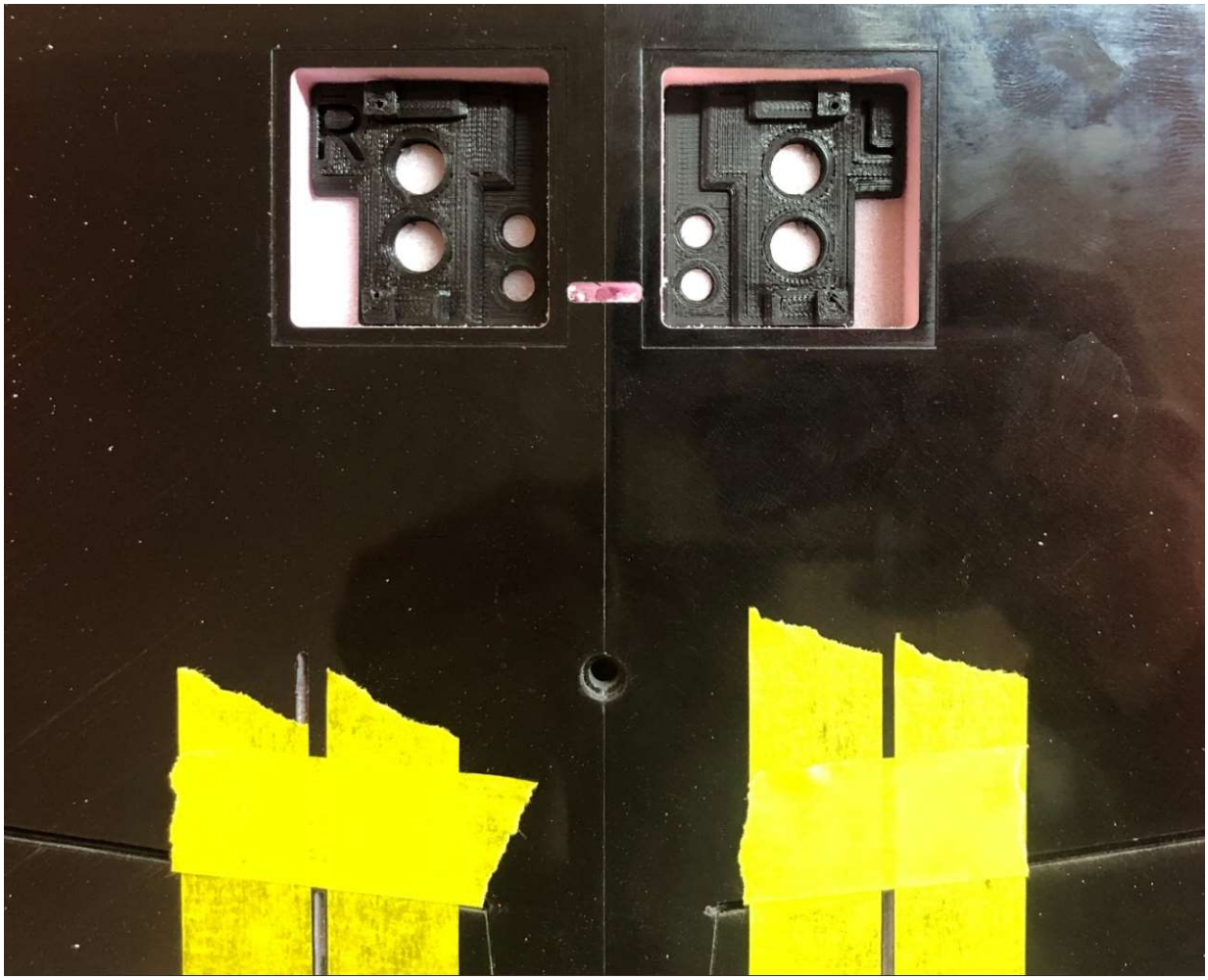
Right wing , Right Servo tray (top view of the model)

Roughen the Servo trays bottom

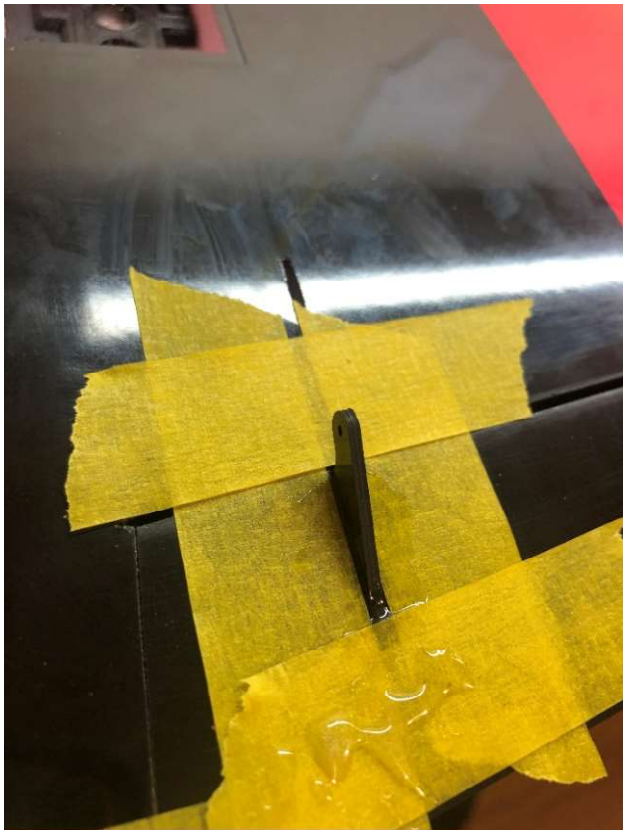


With a rectangular section jewellers file widen the slot in the foam to let the elevon linkage move freely.

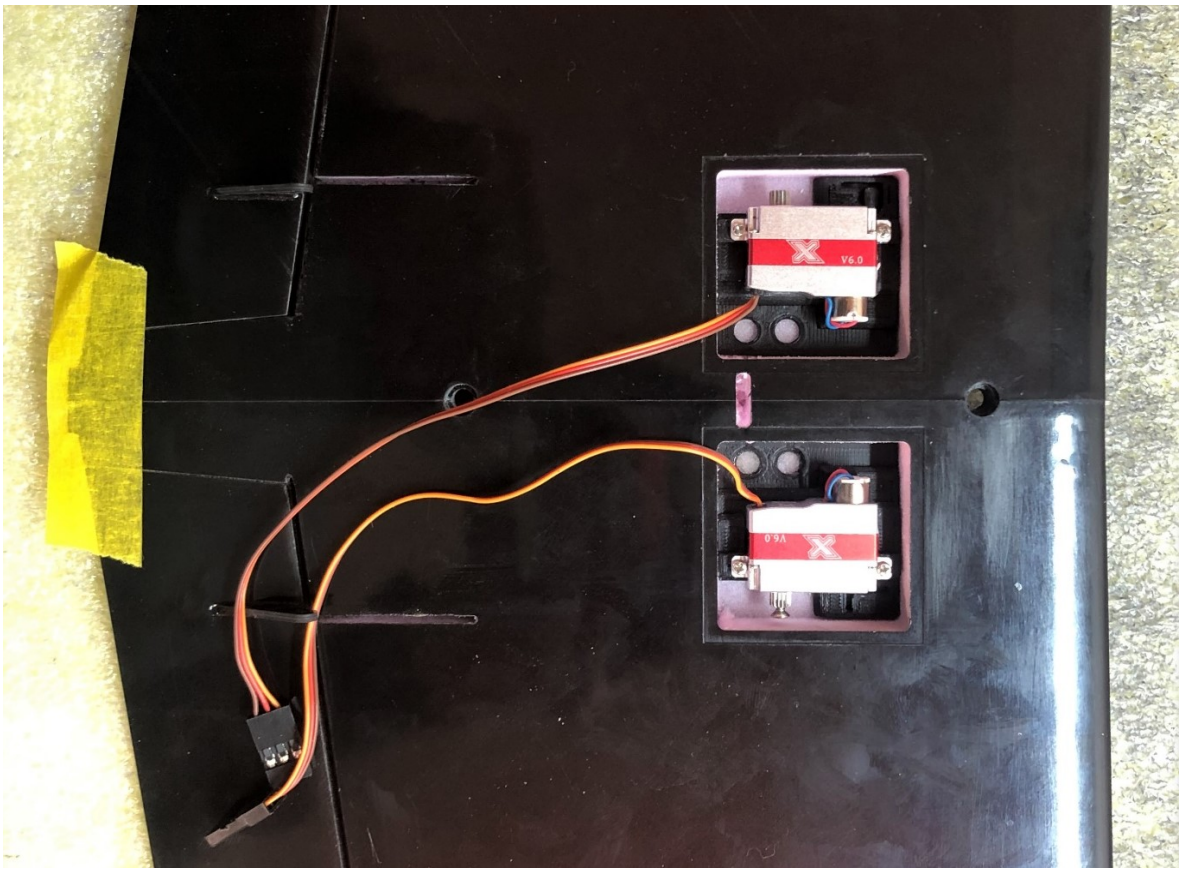
Protect the bottom skin with tape before glueing the elevons horns



Roughen the base of the horns

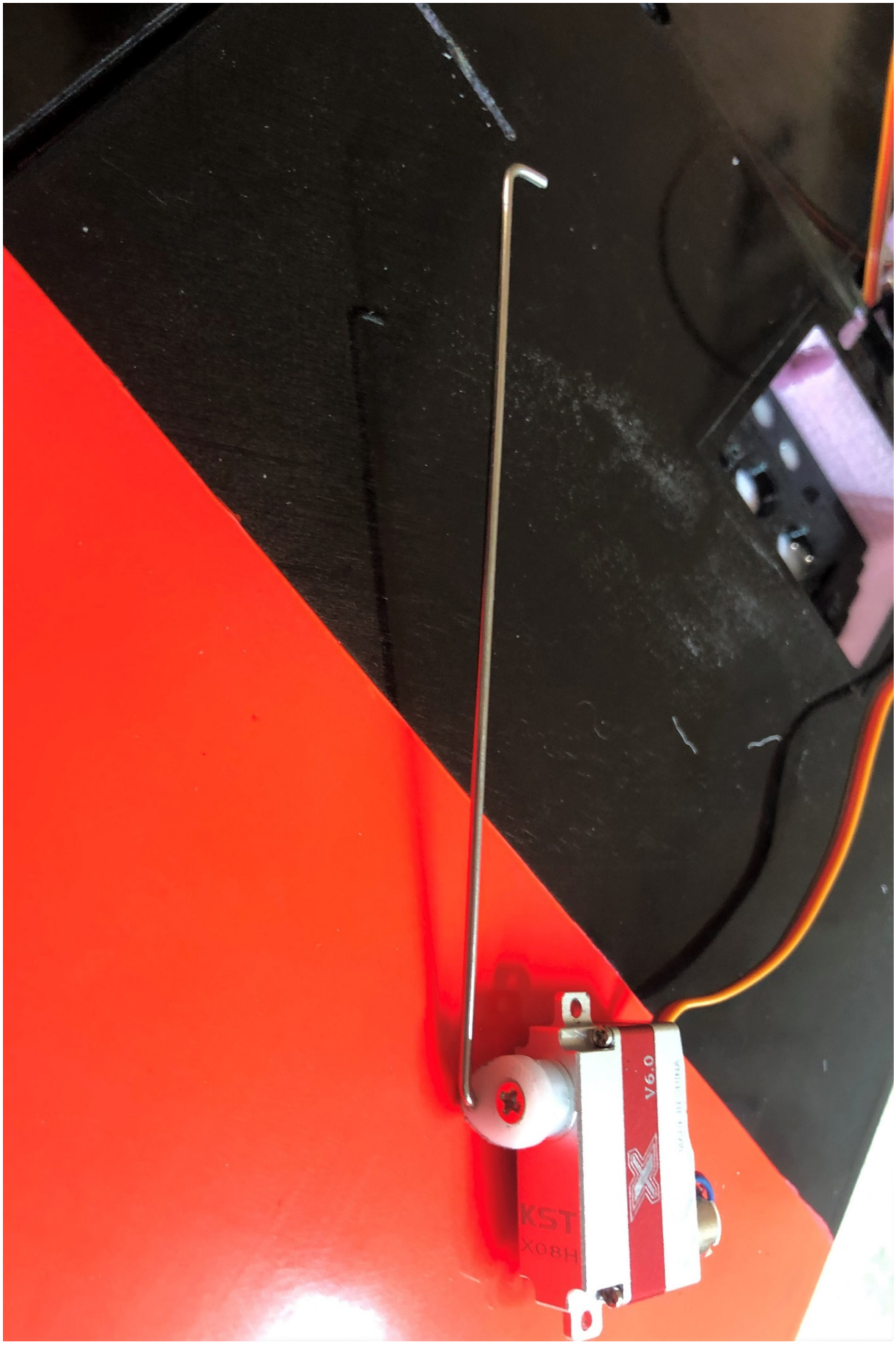


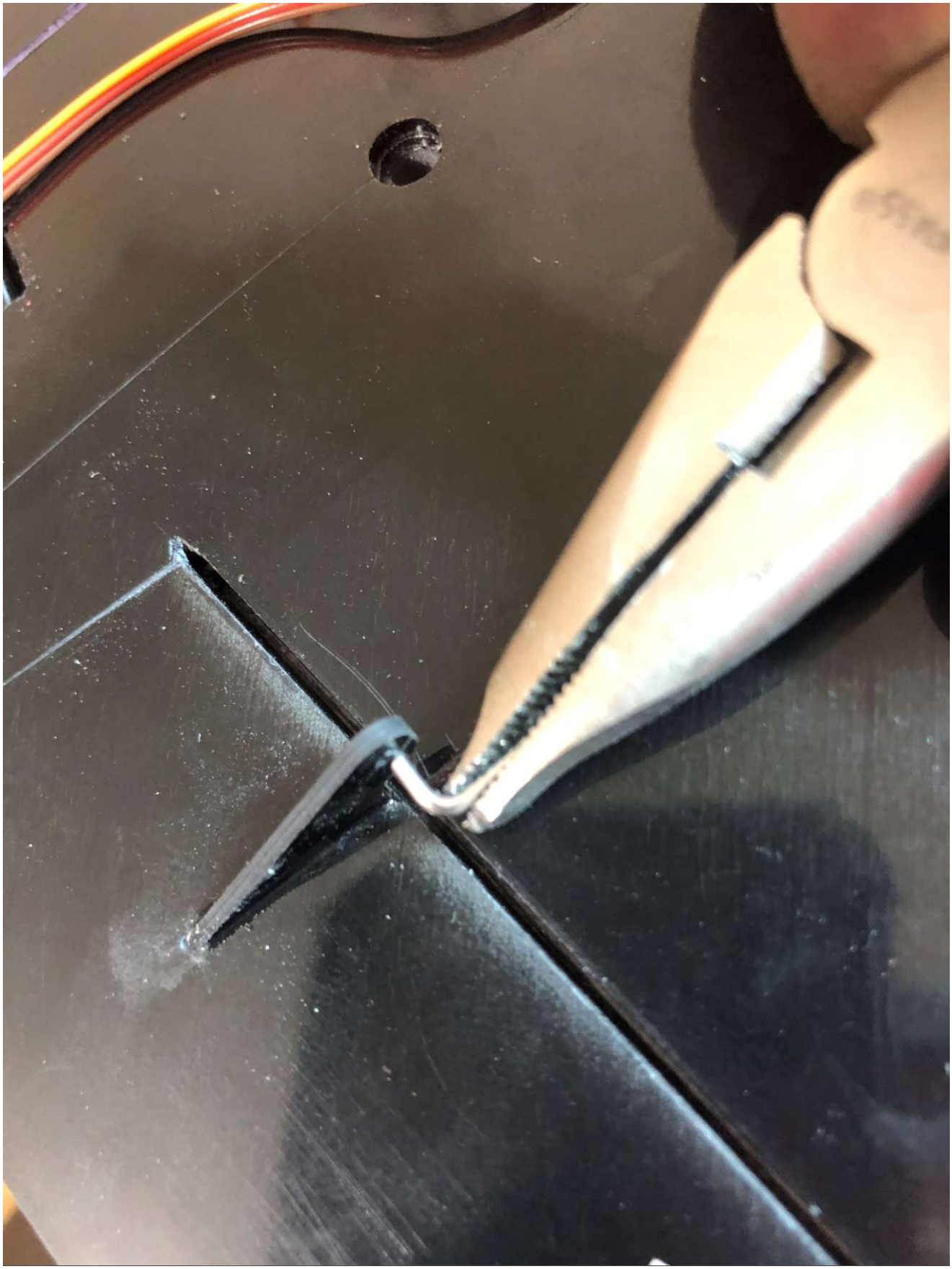
Epoxy glue the elevon horns into the slots, ensuring they have good contact with the wing foam core. Do not use superglue (cyanoacrylate) – the foam will melt.

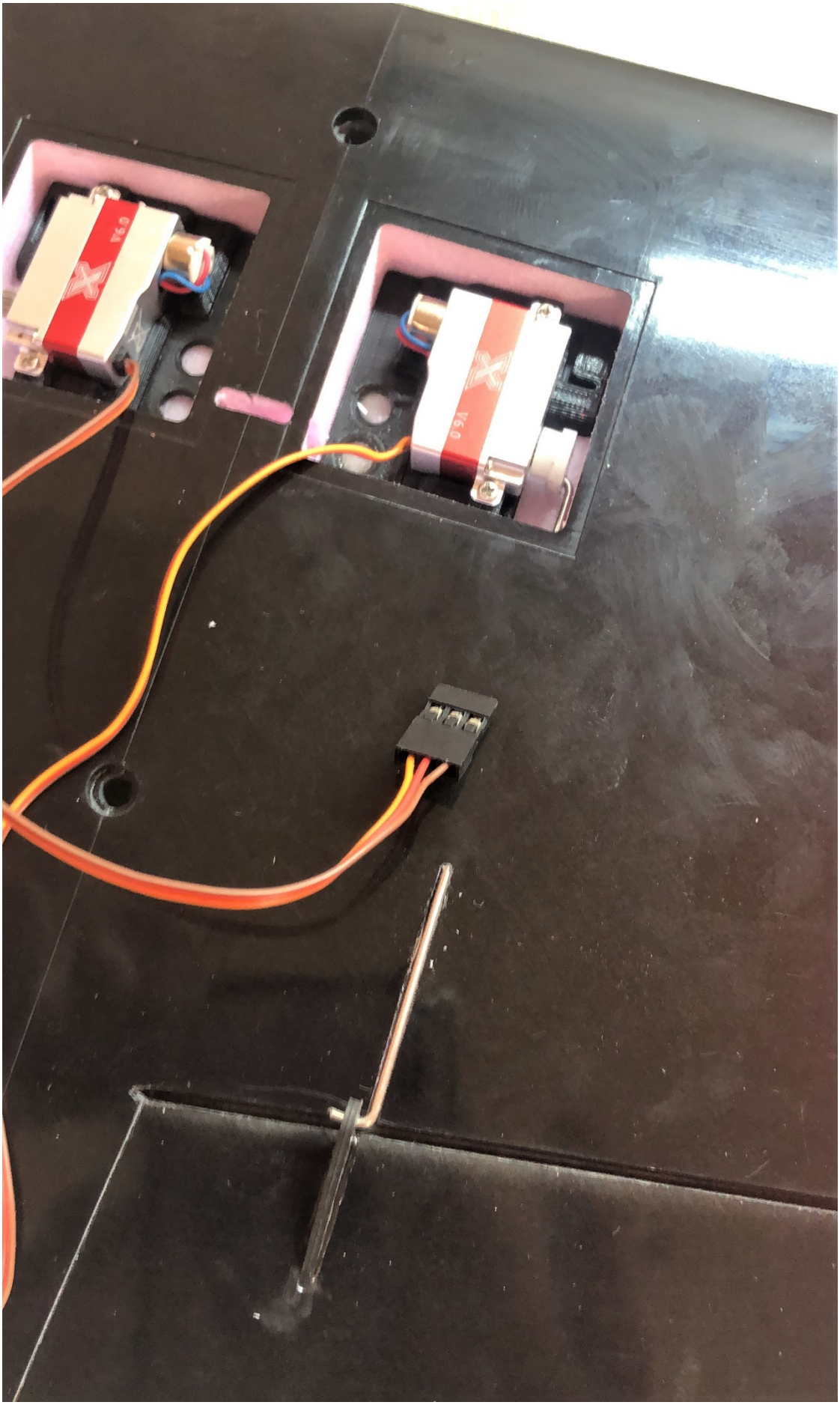


Secure the elevons in the neutral position using masking tape.

Use a permanent marker to check the exact location of the bend before this very precise step. Be sure to avoid any angle between the two bends. The control throw, symmetry, precision of the command chain, and the absence of play are hugely important. Getting this step right is essential for the good control of the glider!


V6.0
KST
X08H



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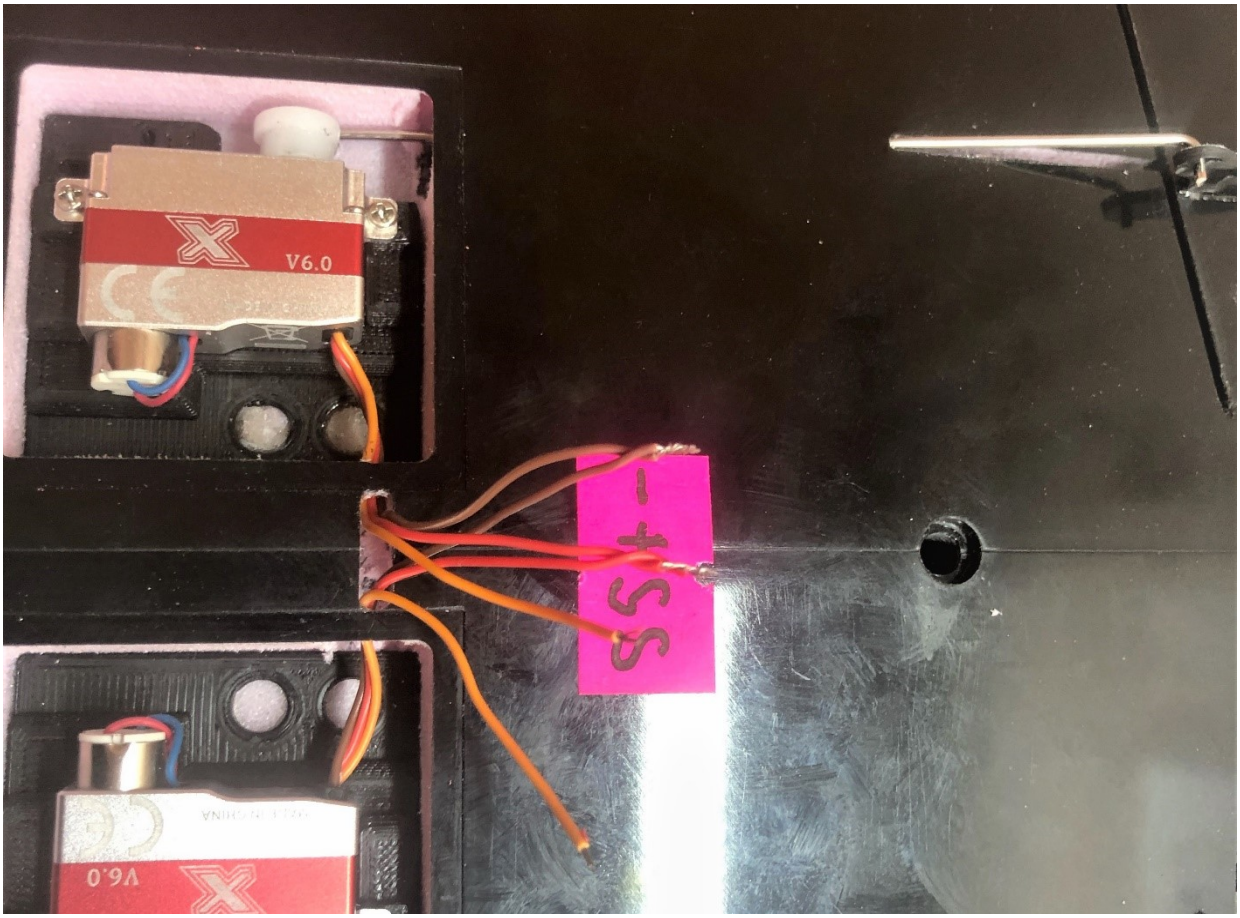
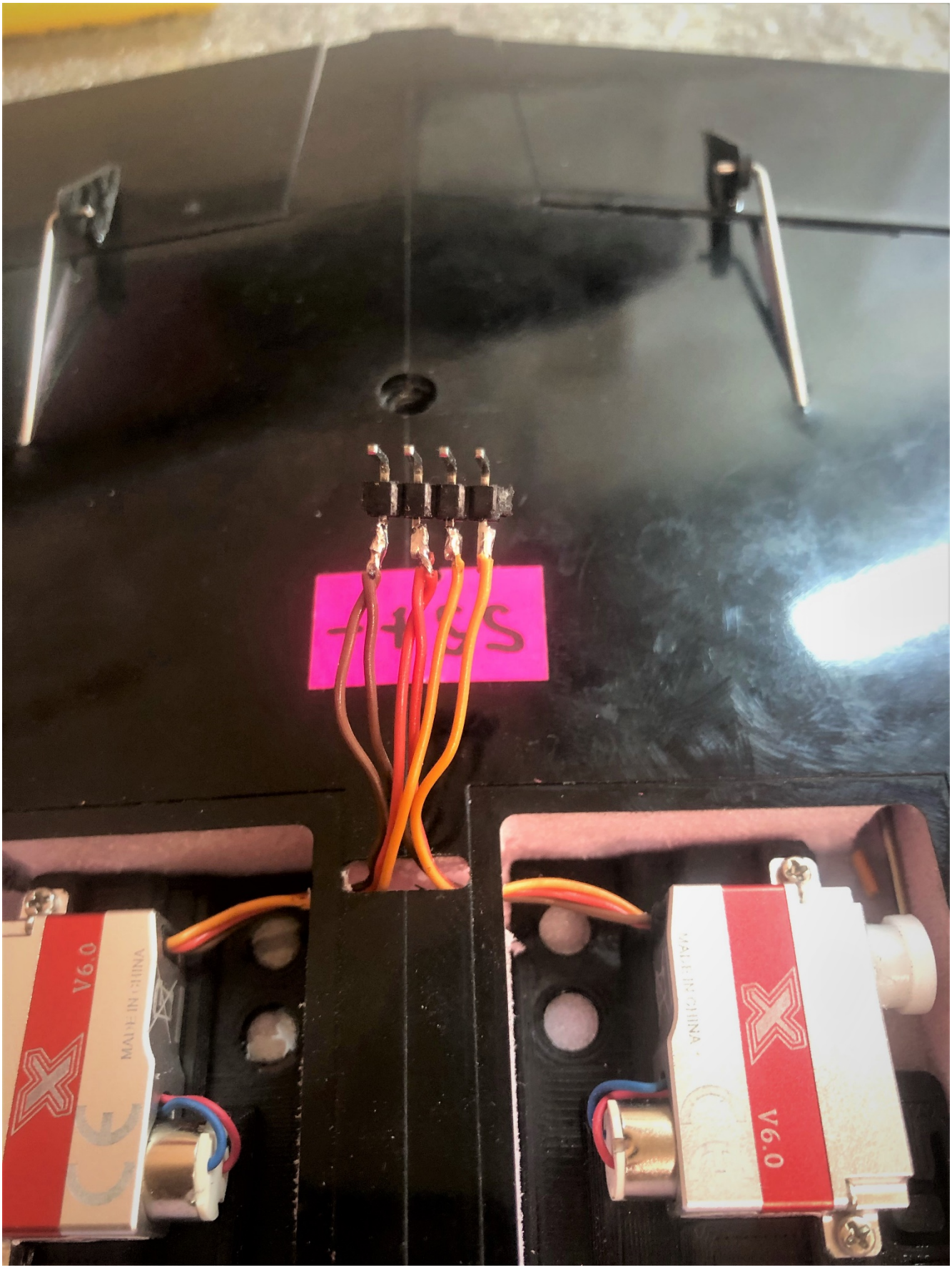
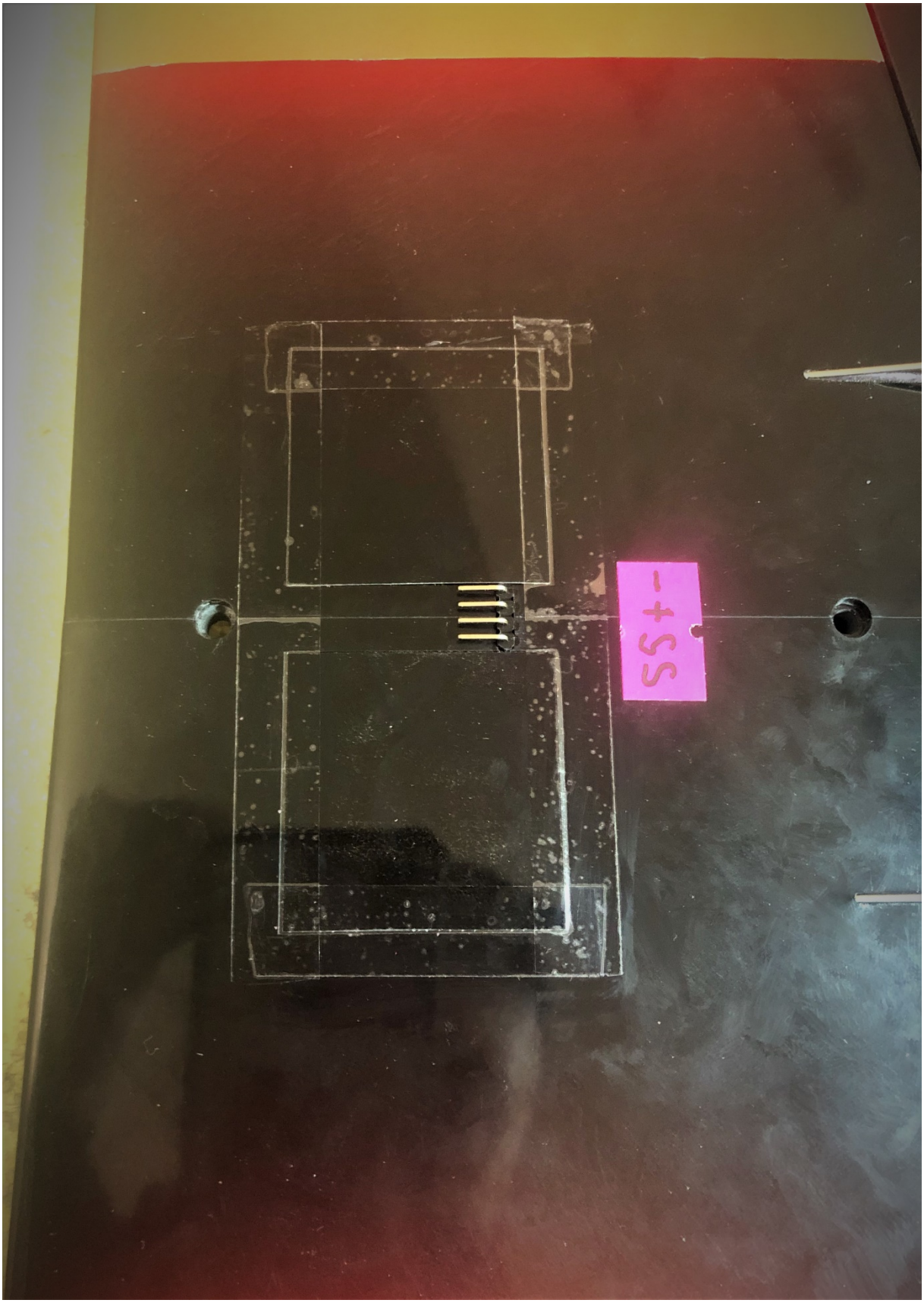
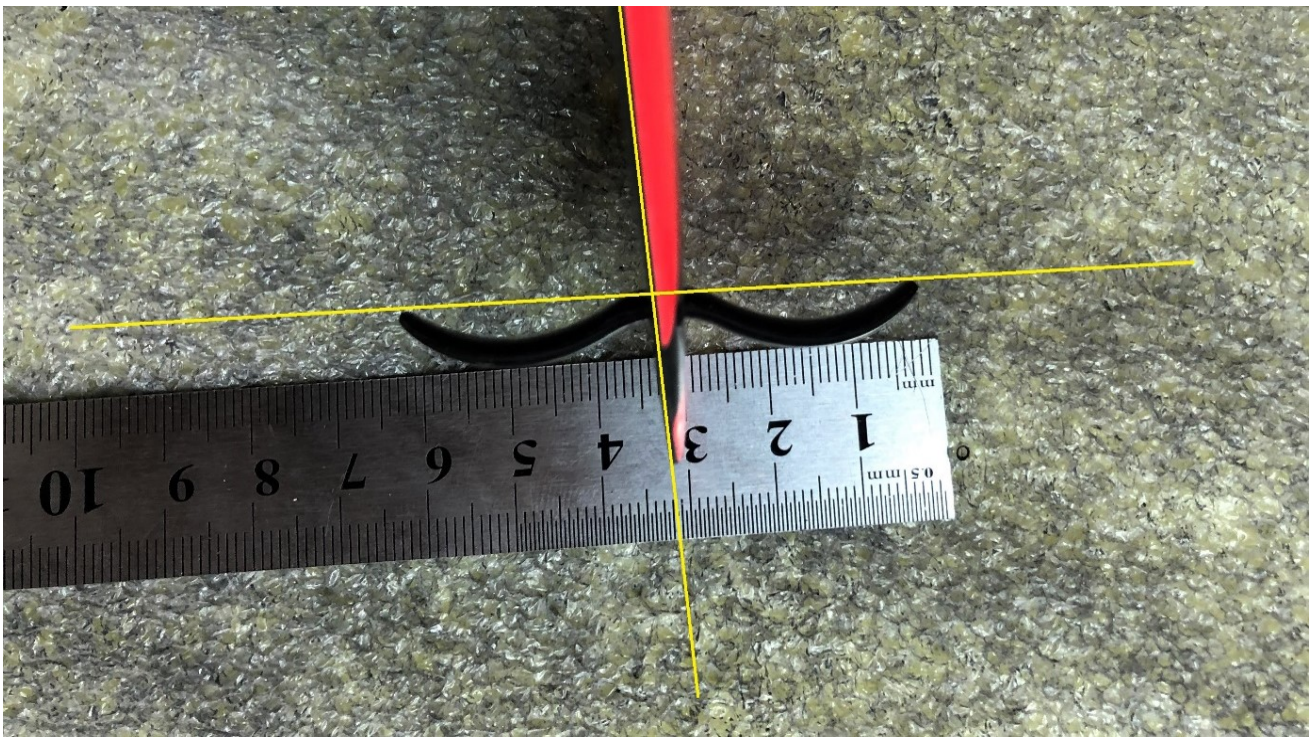

V6.0
SS+-



Insulating the soldered joints with heat shrink is not shown here but is highly recommended.


SS+-


13 mm
0-5
2-5

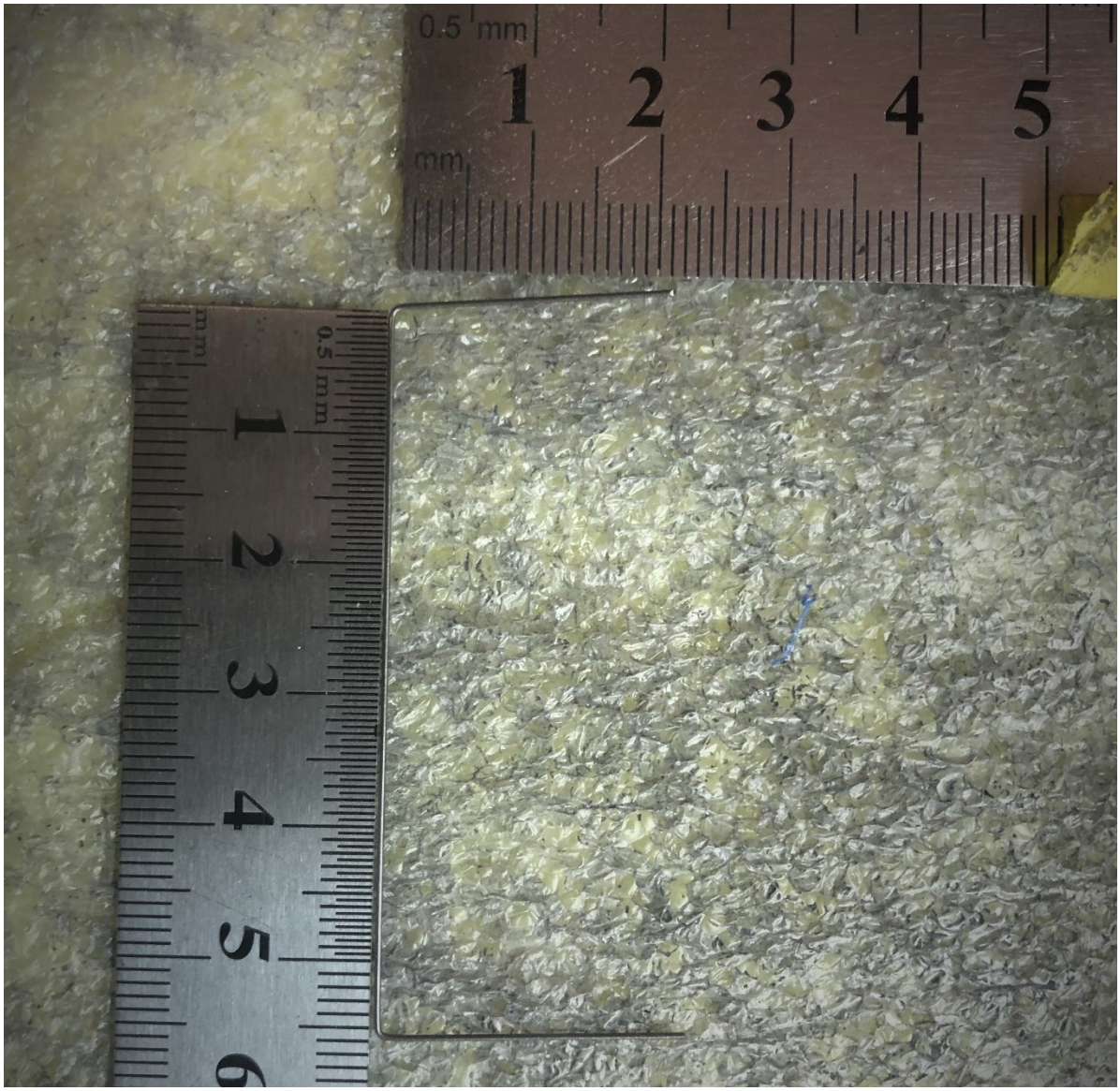


A classic dlg peg installation is shown above. To optimize the forces that are transmitted during rotation (discus launch), adjust the angle of the throwing blade while gluing . Set it to a with a natural position with respect to the length differences between your first two fingers*. Usually a 2 to 5° offset angle (on top view) optimizes the release of the glider. Use slow cure epoxy or super glue/cyanoacrylate to glue the throwing blade into the wing. Preferably strengthen the joint microbaloon fillets. Both the left and the right wing are strengthened for throwing blade installation, so the model can be built for left-handed or right-handed launchers.
*Shoulder, arm, wrist and half wing should be inline.

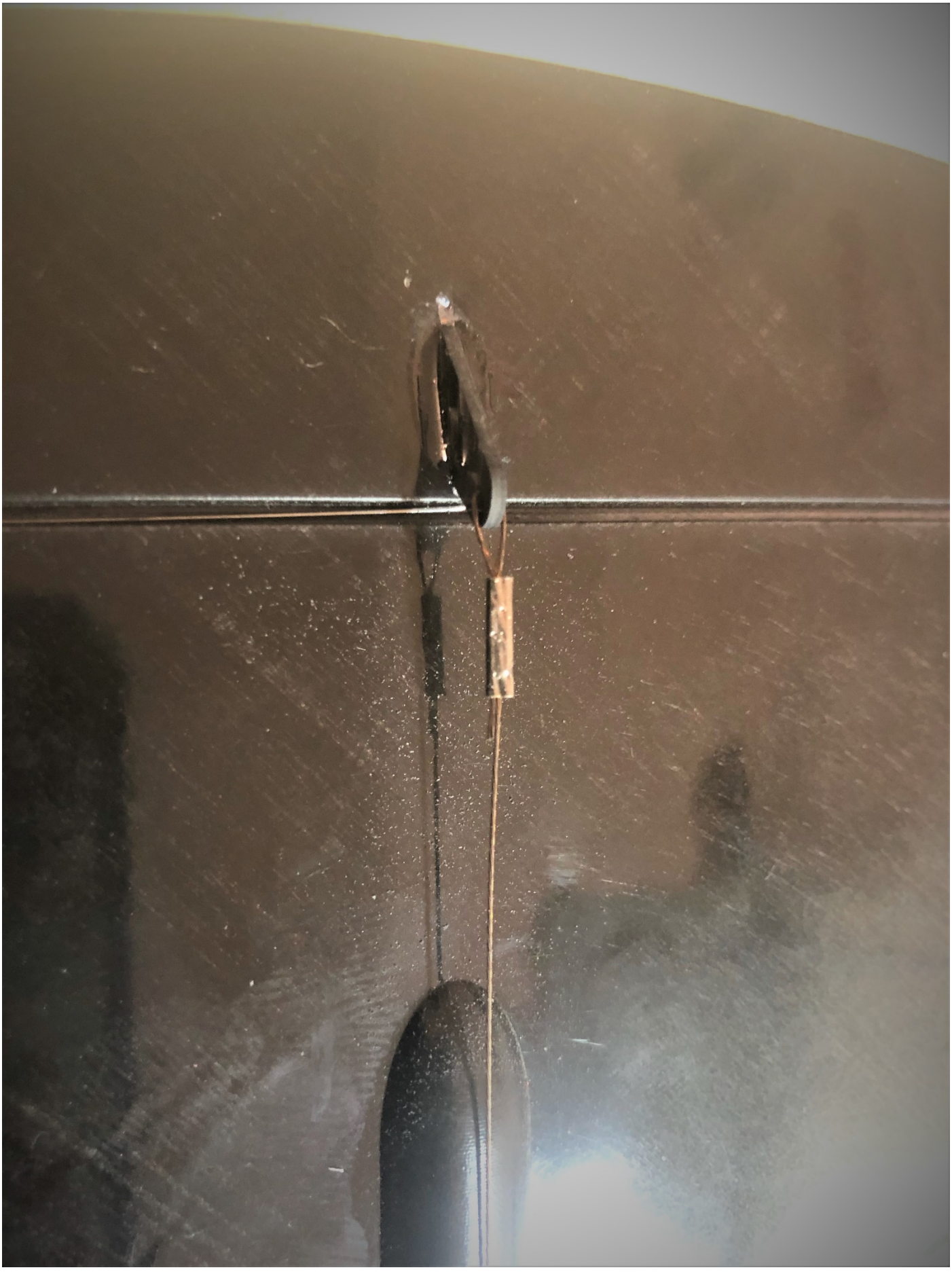

mm
0.5 mm
1
2
3
4
5
6
7
8

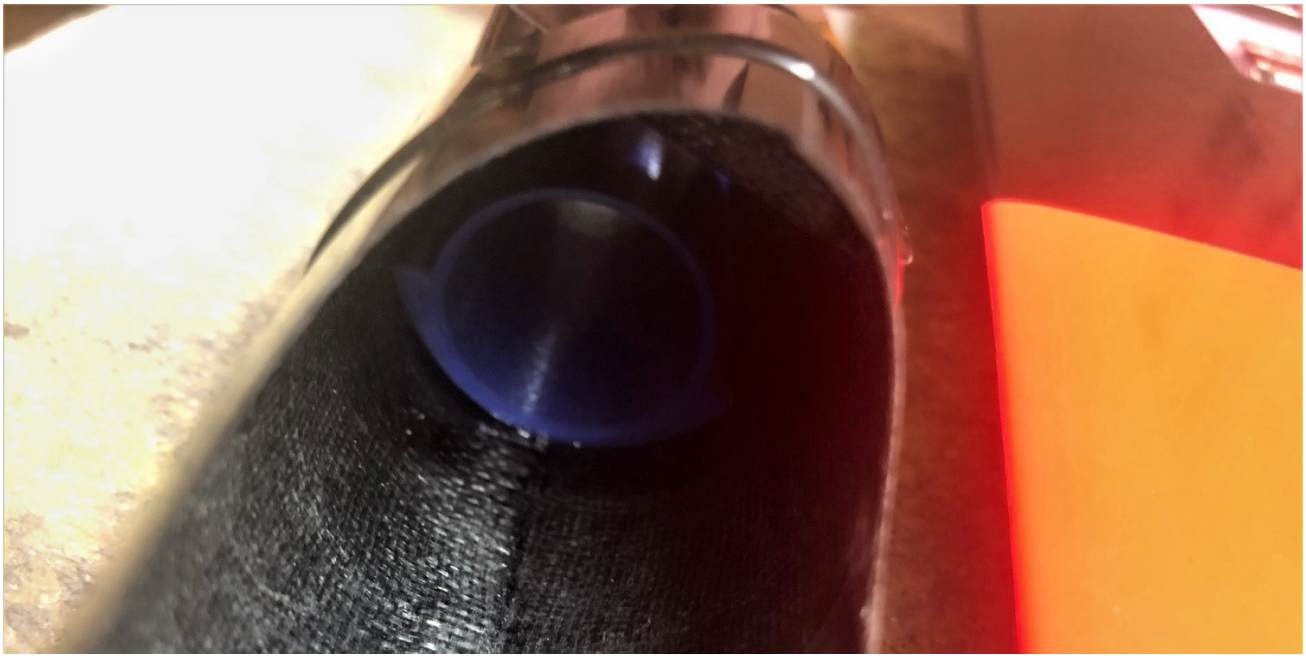
Epoxy glue the rudder horn into the slot, ensuring it has good contact with the foam core. Do not use superglue (cyanoacrylate) – the foam will melt.

Glue the fin using a small quantity of epoxy, for precise alignment.

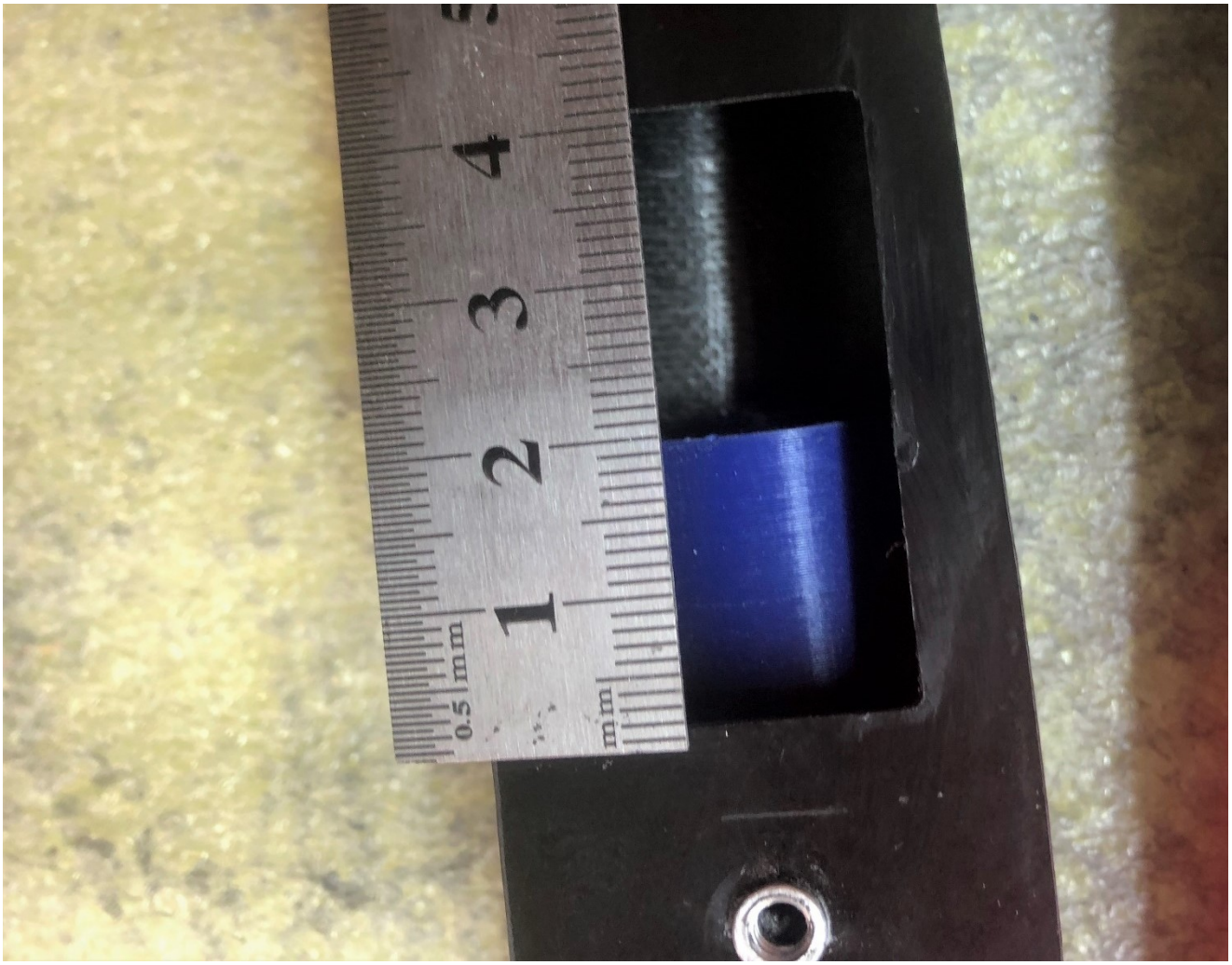

0.5 mm
1 2 3 4 5
mm

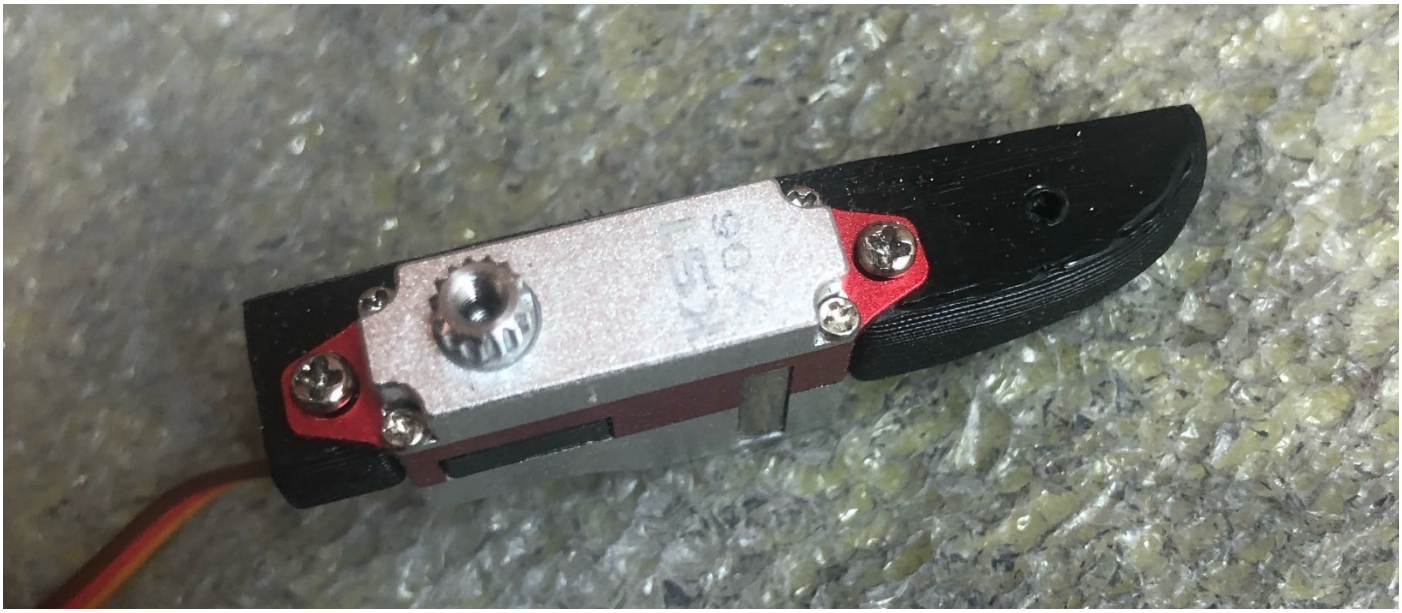
Use a Dremel tool to cut a slot for the rudder pull-wire wire. Right handed launchers should have the rudder horn and the slot on the right side of the model

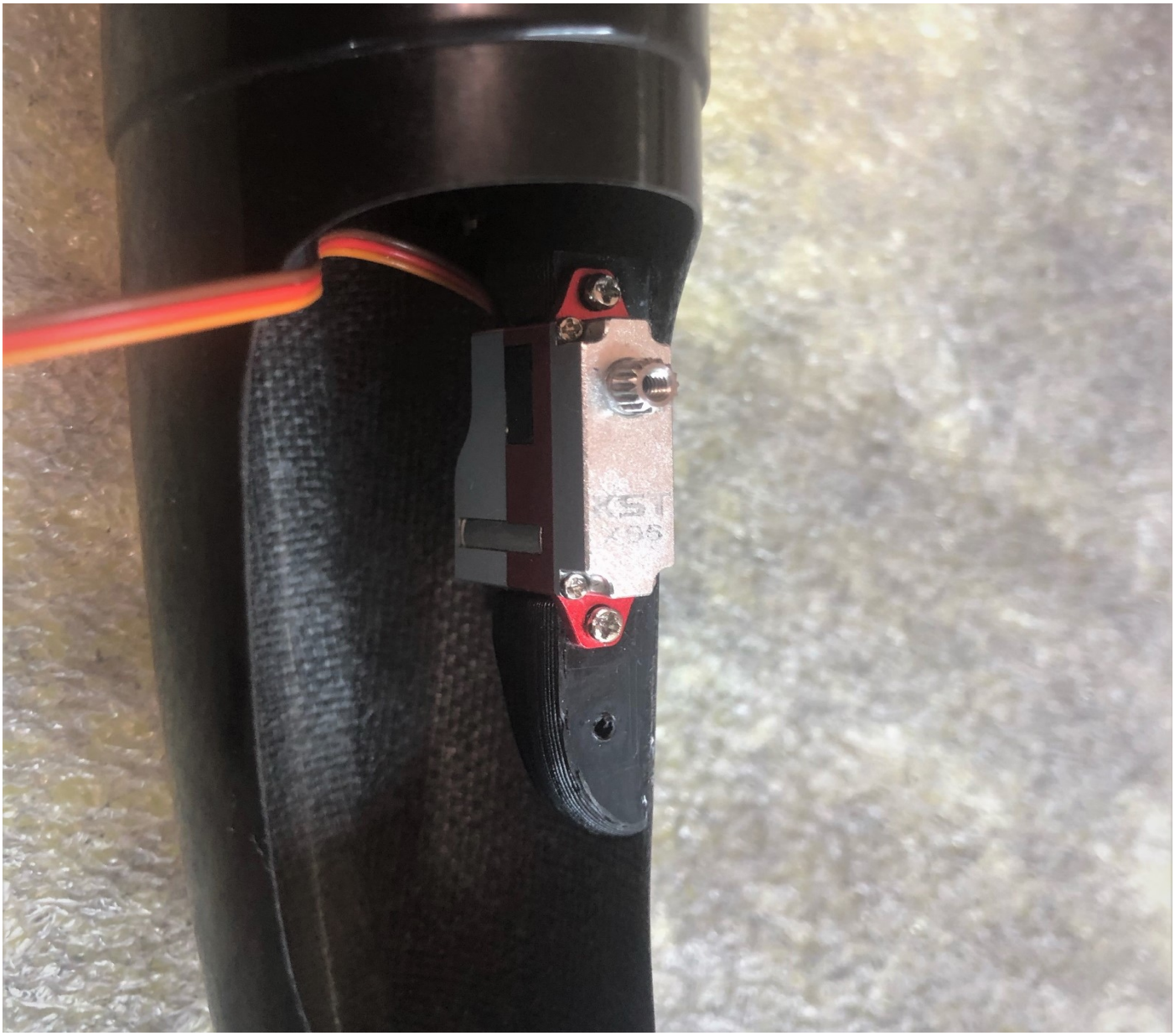




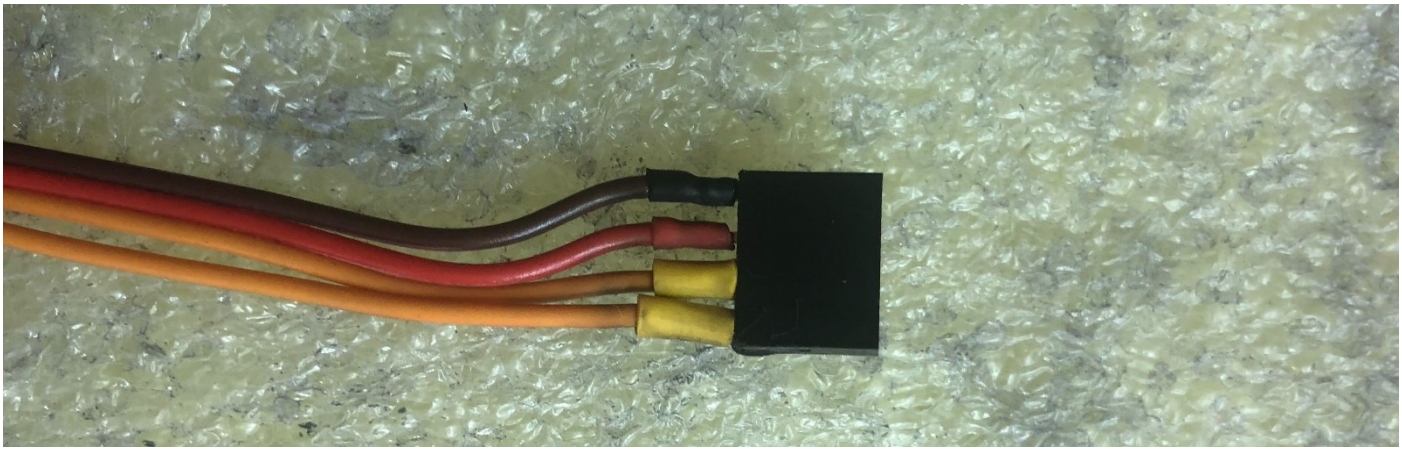
THE Middle of the BALLAST HOLDING PIECE must be placed at the CG location : between 29 to 30mm from Wing Leading Edge. Glue with epoxy or super glue/ cyanoacrylate

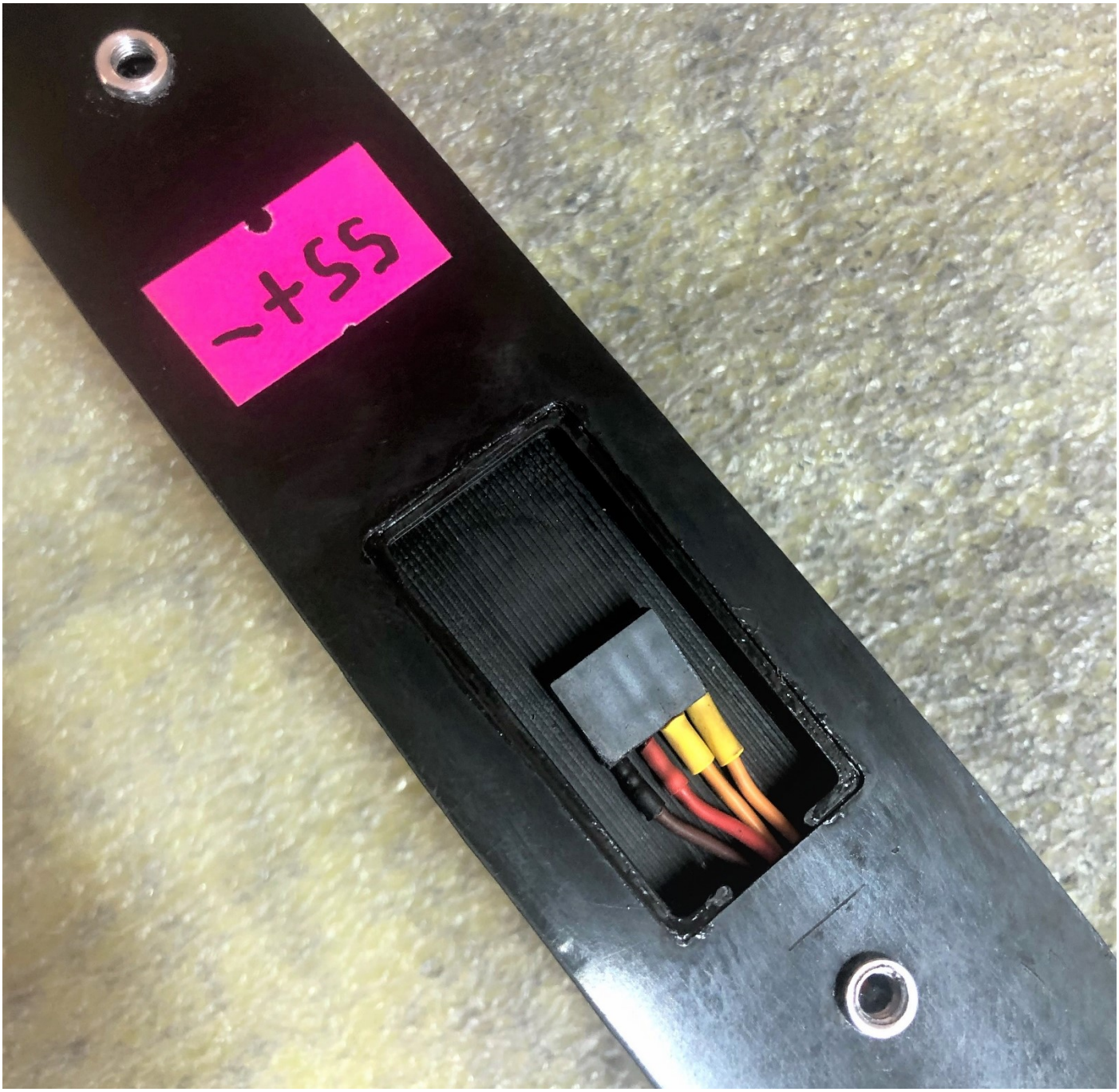






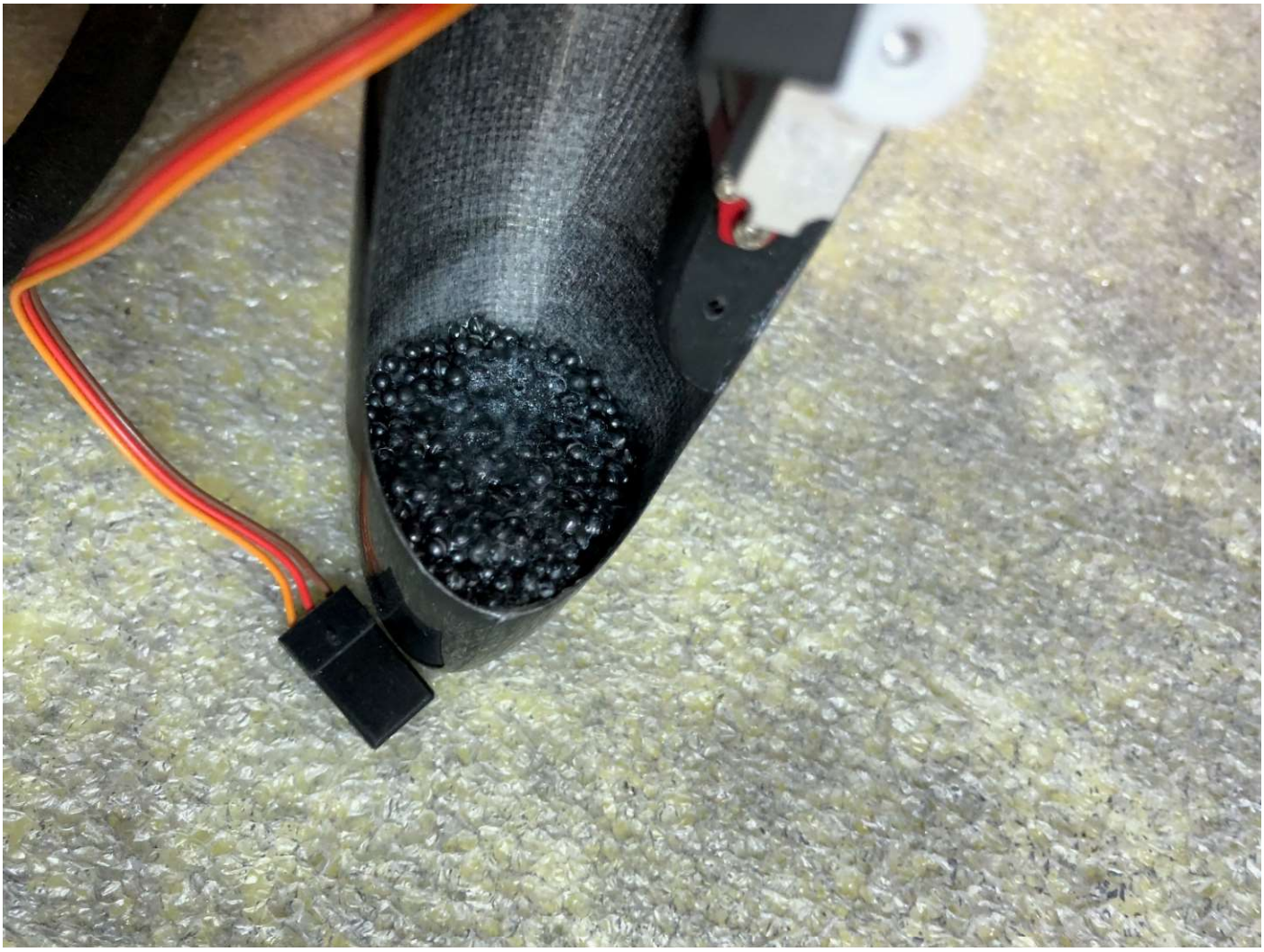
Glue with epoxy or super glue/cyanoacrylate





Glue with epoxy or super glue/cyanoacrylate

Suggested ballast slug (not provided). Approx 19 mm diamter by up to 50 mm long



The last assembly operation is balancing the glider for a 29-30mm CG. We need between 45 and 50 grams of lead. Yes, a longer nose would allow a lower the total weight but the extra nose length would have required more fin area, and would have increased the moment of inertia, making the model les responsive. Mass is energy, and for a versatile use (slope – DLG – DS) we need it!

2 solutions for the nose weight :

A little plaster mold of the fuselage front, to have the rightly shaped piece of lead in the fuselage, and we glue it in place

Or the equivalent mass in lead shot, secured with glue. Cyanocrylate + accelerator or epoxy does the job.

The ballast can be a 170g lead cylinder – this allows higher speeds and is recommended for windy slope and DS flying. Be sure to tune and bend the rod/hook length so the CG does not move.

Due to the extra weight of the PEG installation , it is adviced to balance the opposite wing. Usually 1.5 or 2 gr are needed. You can press in the foam a small diameter steel of this weight after a discrete notch at the wing tip. If neglected, the stability of the slow speeds can be disturbed.

Now let's talk about the most important, the tunings.

As you may know, flying wings are very sensitive to elevator neutral position even more so to CG location. Here some tenths of a millimeter can really be felt.
The ALIEN glider needs +/- 3.5mm Up and Down rates for elevator. NO MORE FOR NORMAL FLIGHT!
A HIGH precision (resolution) is required, that's why the elevon servo mount and control linkage needs to be of high quality.
0.2mm resolution and thus a precise return to neutral mode position is essential!
A 50% exponential mix is recommended for first flights.
If you want a precise trim, be also sure to select the best servos (avoid any play in the servo head!)
For the elevons we recommend KST X08H with Global Supply 1S or 2S lipo battery.
For the rudder we recommend the KST X06 preferably on 2S. Do not use the X06 for the elevons – it is not precise enough.

CONTROL THROWS FOR ALL FLIGHT PHASES

ELEVATOR movement: 3.5mm up & down. Expo and dual rates suitable for first flights

AILERON movement : 11mm up / 7mm down. This differential is nice for slow thermal flight (DLG). Less can be used for fast slope flight.

RUDDER : 16mm left & right

AIRBRAKES : It is possible to reduce the speed by using the elevons as sort-of airbrakes. to ***USE UP ELEVONS*** to Maximum Rates possible, with a momentary and fast switchable command only (on a flight phase). Of course, no other compensation possible to stabilize the model in the pitch axis, so one must use it with the good rhythm and short duration . The Angle of Attack hugely increases to the stall. The model will really loose around 20 % of speed, but inevitably stalls if overdone. Usually only one or two meters of altitude is needed to regain a normal flight speed or attitude. Use it with good altitude for first tests , at not too high a speed.

For a DLG use, with a bit of practice, the glider can be caught by hand or PEG. Land in the normal way for the first flights, nose to the wind, and only try hand catching when you are used to its response.
In conclusion, the control movement should be setup to give at least 9mm down and The maximum possible up. The elevon neutral position should be 2mm up, preferably with the servo near its neutral position.

FLIGHT PHASES

WARNING: Neutral airfoil position is corresponding to High Speed mode!

Be sure to set the elevator trim to 2mm UP for the first hand launches! Don't allow this to disturb your mind!

Below are the elevon neutral positions with CG set to **29.5mm** from the root leading edge

HIGH SPEED MODE:	**0 mm**	(with dual rates possible)
SPEED MODE (and DLG ZOOM mode)	**0.5mm UP**	(with dual rates possible)
CRUISE MODE :	**1.5mm UP**	
SLOW FLIGHT AND THERMAL MODE :	**2 .5 mm UP**	
MOMENTARY PRESET FOR DLG :	**2.5 - 3mm UP**	
AIRBRAKES :	**12 to 15mm UP**	

EXPO : my personal choice 40% on each axis.

HAVE FUN WITH THE « ALIEN » !

OA COMPOSITES Team