ARESTI 2m

A high performance aerobatic model glider for slope soaring,
Designed by James D Hammond and brought to you by Sloperacer.



Thank you for purchasing the Aresti 2m. The design remit was to improve the flight envelope of James's previous design the Vector 3. To this end the Aresti has an improved low drag symmetrical wing section, a fixed tailplane with elevators,a larger rudder area and many other details. A much stronger airframe construction was an important consideration. The Aresti also features a brand new wing spar/shear web which is in the shape of a sine wave. We hope you enjoy it whether you like to fly the right way up or not!

The Aresti is a high performance sports model and deserves really careful installation just as you would with a top end competition model.

To complete your model you will either have to obtain the following from your distributor or supply your own:-

Wiring loom, hardware, ballast and optional wing and fuselage bag set.



Ballast:

The Aresti takes a 16mm diameter by 105mm long brass slug in each wing. In the fuselage it takes 8 brass slugs of 19mm diameter by 35mm long. Fully loaded the Aresti can carry nearly 1040g of ballast.

Hardware:

Clevises, 2mm threaded steel pushrods, 2mm lock-nuts, RDH arm adaptor with 2mm threaded joiner and a 2mm ball link plus ball-link spacer tube. 5 fibreglass control surface horns.

Radio gear:

The Aresti radio installation was designed around budget 12mm wide Savox SH-255/257mg servos. However, the servo access holes in the wings have been made large enough so that a 10mm 'Thin Wing' servo, such as the KST DS125MG, can easily be installed. 13mm servos such as the Hitec HS85MG will fit with a blister servo cover for ailerons (not supplied). The elevator needs a high quality 10mm servo such as the (recommended) MKS DS6100. You may also like to consider the use of Fu-Fix External Bearing kits (highly recommended) for the wing servos.

The recommended battery is a 2/3AF 1600mah 4-cell NiMh pack, however, a 4/5AF 2000mah pack will also fit (together with a reduced nose weight).

Assembly Instructions

Wings:

Before installing the servos the wing leading edges may need a small bit of work. There maybe a small joining seam lip and this needs to be carefully removed so that the all important aerofoil section is maintained, see Fig 1. First use 100 grade grit paper and 240 grade to finish off. Use a rocking motion to ensure the correct shape but ***be very careful not to remove too much!***

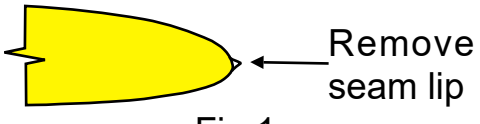


Fig 1

In the hardware pack there are 4 wing pushrods, 2 short for ailerons and 2 long for flaps, fit clevises to all pushrods. The clevises at the servo end will need to be scalloped out so that it does not foul the servo output shaft. (Remove red shaded area)

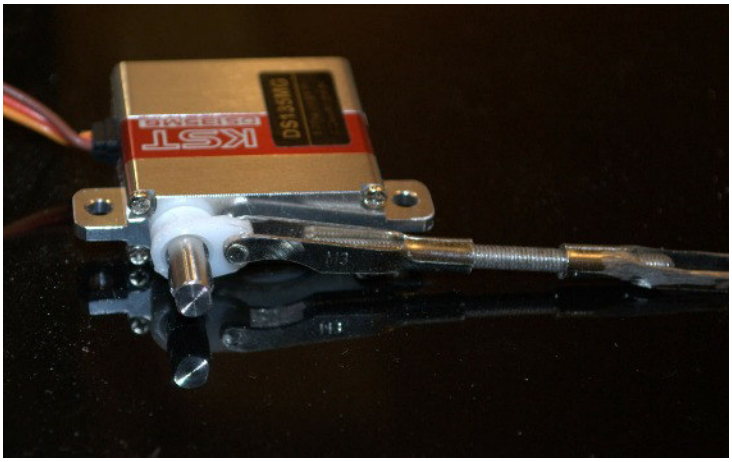




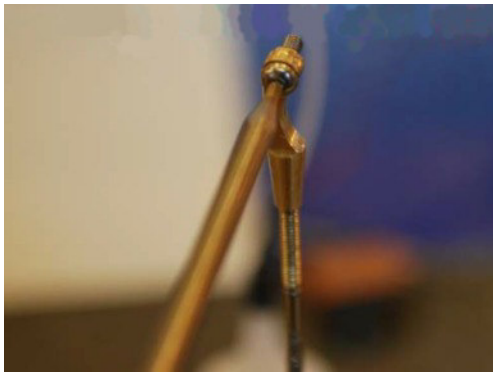
When assembled, ensure that the 2 aileron pushrods are the same length and the same for the flap rods.

Installation of control surface horns

The horn geometry allows a small servo arm and by using nearly all of the servo travel you will have all the recommended throws required. Mechanically, this is much better than longer arms that you have to rate down the travel and provides greater torque and less mechanical play. Depending on the servos used, this should mean that the flap servo needs a 7.5mm arm radius and the ailerons need a 5mm arm radius.



To fit brass RDH adapters: If using a Bearing kit then shape the aileron RDH adapter with a Dremel tool. Cyano a 2mm bolt into adapter **BUT keep turning bolt with screwdriver until cyano has set**. Flatten the top of a servo arm and cut and shape arm as necessary. A locknut needs to be placed on the rear face of the arm, to allow it to engage you will need to grind a flat on the servo arm spline moulding side, then bolt together and cyano a nut to the thread end.

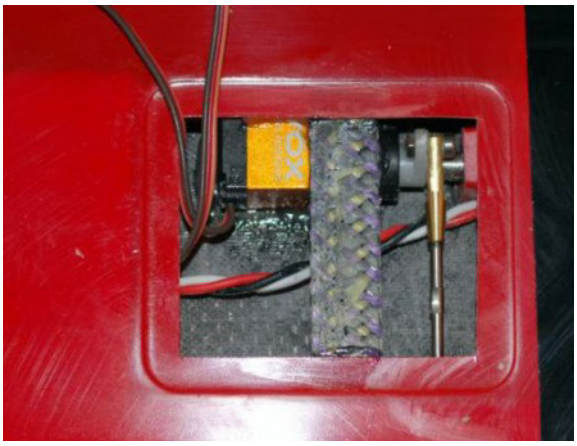


Move the assembly a few times and check that the rotation is in the RDH adapter hole and not turning the bolt. Before you glue the servos in, remember to set the output horns correctly: ailerons 2 splines towards the TE and flaps one spline towards the TE.

(*Tip: Drill the hole using a 1.5mm drill and then use a 2mm tapered tap but only use the tapered tip part and not all the way. This makes fitting the RDH pivot screw so much easier.*)

Check that the wing wiring loom functions properly. (Once installed it is far harder to rectify any faults)

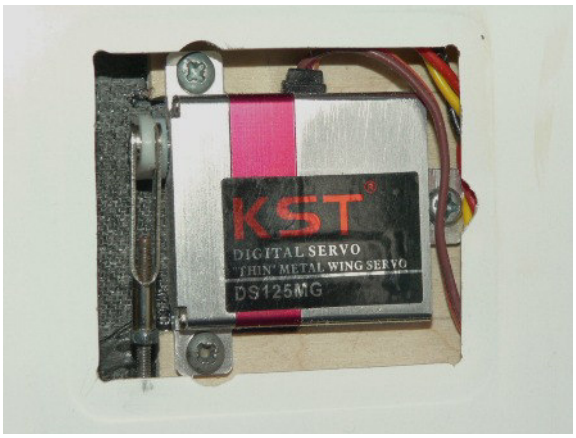
Use coarse grit sandpaper to roughen up the surfaces where the servos will be glued to. If you are using 13mm wide servos for ailerons then these should be installed right under the forward edge of the access cutout, as close to the spar as possible. You may also want to cut off the servo mounting lugs in order to move the servo nearer to the deepest part of the wing.



If you are gluing the servos to the wing then do not sand or clean the servo. This is important as it allows the servo to release if you ever need to remove it. Gluing actually uses very little epoxy.

If you wish to add the Fu-Fix External Bearing kits for extra support to the aileron and flap servo output shafts then fit them as per the instructions that come with these kits.

A support strap can be added. It's not critical what it's made from, thin G10 fibreglass is very good but basically anything that is about the same strength as the top skin. Finally glue the bearing housing to the bottom skin. This all ensures a ridgedly held servo. Servos that pop off do so because of flex in the skins. Doing it this way there's a lot of gluing area and no flex so the servo cannot pop off. A weak glue joint with an unprepared servo is perfectly adequate. The servo is held on the top skin, bottom skin and the head is held by the bearing housing which itself is bonded to both skins! To remove just cut the strap, unbolt the shaft and twist the servo. It pops out clean! However, most of the time, it may be that you just need to replace the arm. Then it's even easier as you just unbolt the shaft and leave the servo in situ.



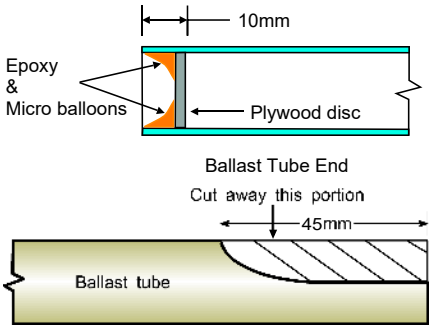
If you are using 10mm thin wing type servos then you should not encounter any real installation problems. You may want to use a 4mm plywood servo mount to make removal easier. If you do then check to ensure that the mounting screws do NOT project below the bottom surface of the mount.

When satisfied with the operation of the wing servos, either secure the rod at each end with lock-nuts, glue or solder.

Fuselage:

Start by making the lead nose weight. Fill a container (e.g. A small plant pot) with damp sand. Tightly wrap the fuselage nose with aluminium kitchen foil. Then insert nose and foil in sand ensuring a close fit and support. Remove the fuselage leaving a good impression to cast your nose weight. Melt approximately 180 grams of lead in an old pan and pour into the foil casting shape. This allows a bit over for shaping with a file to get a good fit inside the nose. Do not forget to flatten the tip as the inside laminate here will stick in a bit.

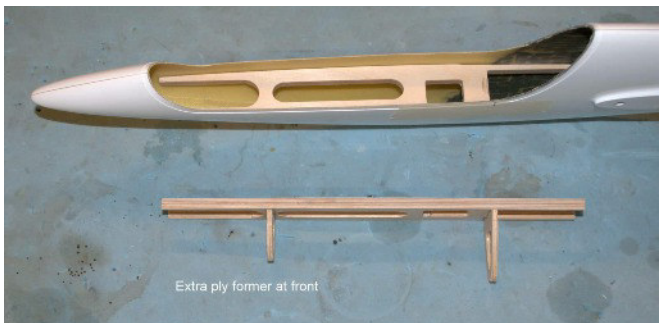
Ballast tube: At one end roughen 10mm on the inside of the tube and using Cyano,glue in a ply wood disc, then backfill the open few mm with thickened epoxy.

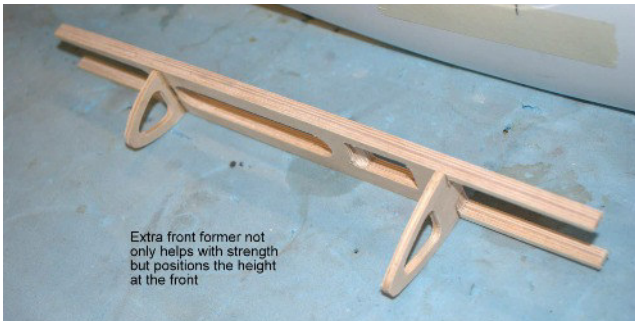


The length of the tube needs to be long enough to fit in 8 slugs (Slug size 19mm(¾ inch) diameter by 35mm long) plus 15mm. Cut the tube end as shown in diagram.

With a pencil, mark on the outside of the tube the point between the forth and fifth ballast slugs. On the fuselage place some masking tape and put a mark on it at a point 95mm aft of the leading edge. When the tube is eventually glued in the marks on the tube and fuselage need to line up.

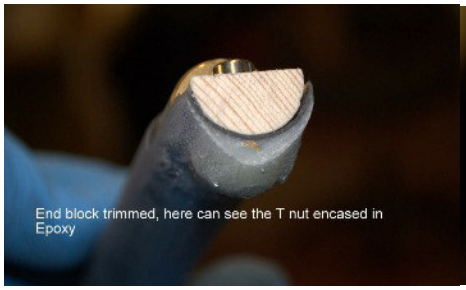
The Aresti comes with a CNC cut plywood servo/radio tray which also adds structural strength to the nose.





Glue the two formers in position. (**Do not glue the tray in yet!**) Note: At the servo position there is a rebate on the underside to help with servo installation.

There are various ways to secure the ballast, one way is to use a 4mm dia by 35mm long bolt together with a 4mm blind nut. Drill a 5mm hole in the position as shown in the pictures. Lightly grease the end of the bolt. Using a mix of epoxy glue with some finely cut glass cloth, glue the blind nut upside down to the bottom of the tray. Screw the bolt in, to ensure that the nut stays in position. When the epoxy mix has cured, fix a few carbon tows or glass fibre strands across the blind nut and to the sides of the tray using cyano glue.





Prepare the fuselage wiring loom, (you have tested it haven't you?). Glue in the plugs, MPX greens are recommended, and site the 4 leads so that they go under the ballast tube. Trying to fit the servo lead after the ballast tube is glued in will prove to be very difficult if not impossible!!!

At the front of the fuselage, roughen up the areas where the radio tray and ballast tube will sit. The fuselage comes with the rudder pushrod factory installed, however, it is necessary for you to fit the rudder end clevis and adapter. With cyano glue a 2mm adapter to the rudder pushrod. Then wind the clevis all the way onto the adapter, use a drop of cyano or epoxy to ensure that the clevis does not work loose in the future. Attach the clevis to the rudder control horn.

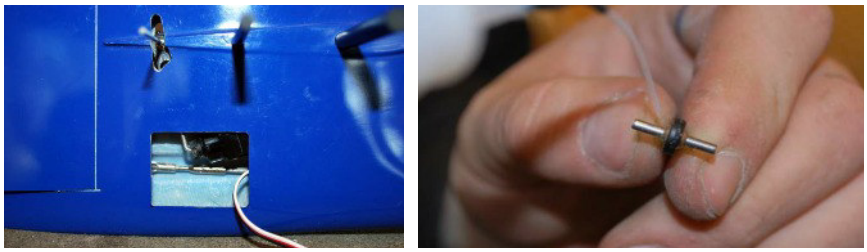
Elevator Servo:

The Aresti has been designed to have the elevator servo mounted in the fin base under the tailplane. Through the fin hatch any 11mm or smaller servo can be fitted. You may want to consider the use of a metal geared servo because should the plastic gears become damaged, removal of the servo may not be easy. The pictures show a MKS DS6100 servo (as fitted in a Schwing)

Test fit the servo, its position should be similar to that shown in the picture. **Ensure that it does not foul the rudder pushrod!**



Join the RDH adapter and the ball link together using the 12mm long piece of 2mm pushrod. The short piece of 2mm dia thin walled tube is cyanoed onto the ball.



(*Tip: Use a pin to transfer only a very small amount of cyano to the tube, so as to avoid gluing the ball link solid!!!*)

Drill a hole in the servo arm as close to the arm centre boss as possible.

You could also fit a Fu-Fix External Bearing should you wish.

Fit the assembled pushrod to the servo arm. Check the servo arm is centred and then glue into position. The servo should be bonded to both skins. Before the glue has set fit the tailplane, check, with the radio on, that the elevator is centred and that the servo is in the correct position. (Trying to adjust the pushrod length once the glue has set, is rather difficult!) When the glue is set check for a 'bind free' elevator operation and make any adjustments if necessary. Fit the servo lead extension.

Note: the slots for the elevator drive wire may need some slight adjustments with a needle file to ensure full and free movement.

Final Assembly or 'Now you can start gluing!'

Test fit the nose weight, radio tray and ballast tube to ensure that they all fit together. Check that the rudder pushrod does not block access to the ballast.

Slow setting epoxy will give you the necessary working time to get everything lined up and true.



Now remove the tray and tube,then glue in the nose weight. When it's set, glue in the ballast tube, remembering to line up the pencil marks on the tube and fuselage. The wires to the receiver should run underneath the ballast tube. Insert the wing joiner into its fuselage holes (secure it with some masking tape) to ensure that the ballast tube is kept in the correct position

Finally, fit the radio tray. Do ensure a good joint to the ballast tube and fuselage with the tray. The tray is 6mm thick to add structural strength but it won't be doing much if not bonded properly!

Once the tray is installed fit the servo or servos and connect them to their pushrods. The servo arms only need to be 6-7mm long (centre of arm to centre of hole). You will have to scallop the clevises again. Fit the receiver and battery. You may have room for a switch but if not then plug the battery directly into the receiver. With the model fully assembled add lead to balance (do not forget to check the lateral balance)

A set up guide from one of our test pilots is included on page 8. It's quite safe, especially the CG setting, most flyers have only varied from this setting by a few mm.

Happy flying!

Aresti 2m Setup

Item			Additional Information
C of G	95mm		From leading edge at wing root
Elevator	7mm up	7mm down	30% expo
Rudder	40mm L	40mm R	30% expo
Ailerons	20mm up	18mm down	30% expo Measured at Ail/Flap interface
Flap (with ailerons	8mm up	6mm down	Measured at Ail/Flap interface
Elevator to Flap (Snapflap)	3mm Flap	2mm Aileron	Measured at Ail/Flap interface
Thermal	Flap 3mm down	Aileron 1.5mm down	Measured at Ail/Flap interface
Speed	Flap 1.5mm up	Aileron 1mm up	Measured at Ail/Flap interface
Crow brakes (Butterfly)	Flap 45mm down	Aileron 20mm up	Measured at Ail/Flap interface Add elevator to suit (approx 5mm down)

All the above values have been proven to work, however, experienced pilots will adjust to taste

Contents:

Fuselage
Canopy
Ballast tube
Ballast tube end disc
Servo tray
Wing panels left and right
Wing joiner
Wing servo covers 4 off
Tailplane halves left and right
Carbon rod 6mm dia x
Carbon rod 3mm dia x
Wire rod 1.5mm x

Optional extras:

Wing wiring loom
Ballast
Wing/Fuselage bag set
Fu-Fix External Bearing kits
RDH pushrod ends



Instructions written by Tony Fu and Peter Burgess (v1)