

Medina and OZeRES 2 Building Instructions

(Slim Fuselage and V-Tail Version)

You must ensure you have MAAA or AMA (or similar National level) insurance before flying this model.

Only fly in designated areas and in accordance with all council, government, airport, CASA and any governing body rules. Ensure the model is built correctly and is checked thoroughly before flight. If you are an inexperienced pilot, ensure you have an instructor or experienced pilot with you at all times.

The manufacturer of this model kit takes no responsibility for your actions.

Building is fun but please remember you are responsible for your own health. Almost all adhesives contain solvents and other volatile substances and must be used with adequate ventilation. Ensure you follow all the instructions on the adhesives and equipment being used.

Be careful with CA (superglue) because it can glue your eyelids and fingers together very quickly.

Working with Balsa and Carbon can cause fine dust which must not be inhaled or swallowed.

Always cut and sand Carbon wet and do not blow carbon dust from the building board, remove it with a vacuum cleaner.

Using tools can cause injury.

Operating a model aircraft can cause accidents so you must have insurance before you fly this model aircraft.

Join a club (and the MAAA) and ensure you are properly trained and have an experienced person helping you.

Marcus Stent and Performance Models take no responsibility for any damages and accidents that arise from the construction and operation of this model aircraft. It is the responsibility of the builder and flyer.

Now, on to the fun bit....

Building Resources

Building and finishing resources can be found on Youtube here:

[How to build an OZeRES 2](#) by Nick Chitty

[Medina ARF 2 Meter RC F3-RES Glider Build Log](#) by Armsoar

[How to cover a model](#) by Nick Chitty

Before Starting

Place Food/Cling Wrap (or similar) over the plan before you start.

Use a knife to separate parts from the sheet, do not use your hands.

Trim parts as necessary.

Abbreviations

CA = Super glue

RHS = Right Hand Side

LHS = Left Hand Side

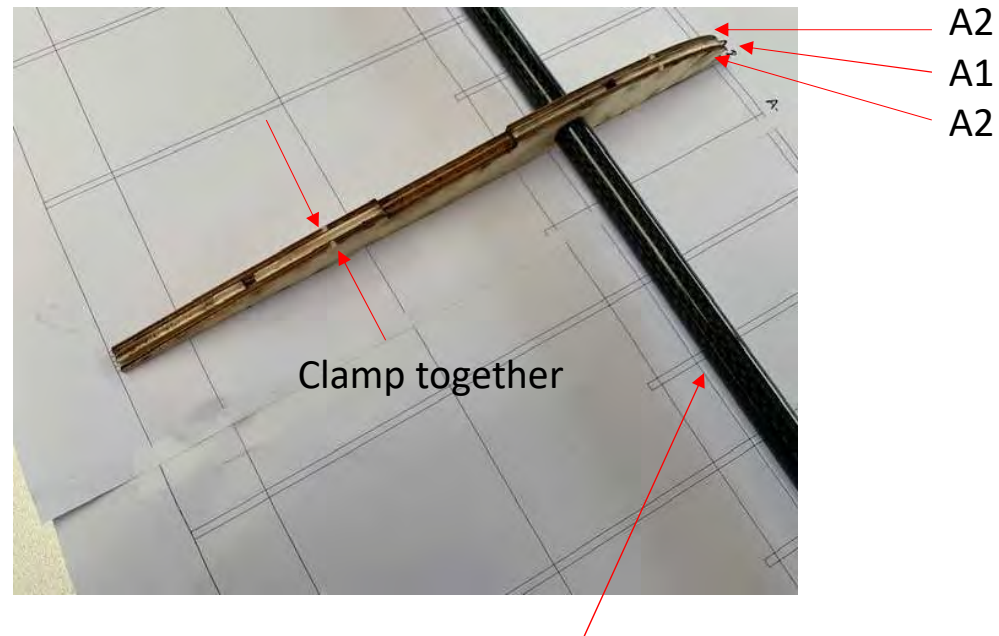
L.E. = Leading edge

T.E. = Trailing edge

Wing Assembly

Start with Wing Centre Panel A

Slide the central ribs A2, A1 A2 on to the 12mm diam. x 700mm Carbon spar and align over the plan. Separate the ribs, apply medium CA and slide together. This must be a secure bond so clamp with pegs or similar. Glue the rib assembly onto the spar.



Ensure you have the 12mm diam. X 700mm long spar



Sand a bevel into the trailing edge.
Use the witness line as a guide. Do not sand past the line.
The T.E thickness only needs to be 0.5 - 1mm thick.

Slide the '6mm joiner' into the '7mm joiner tube' to act as a guide/support to hold the plug square at the end. Insert the plug so it is recessed by about 1mm.

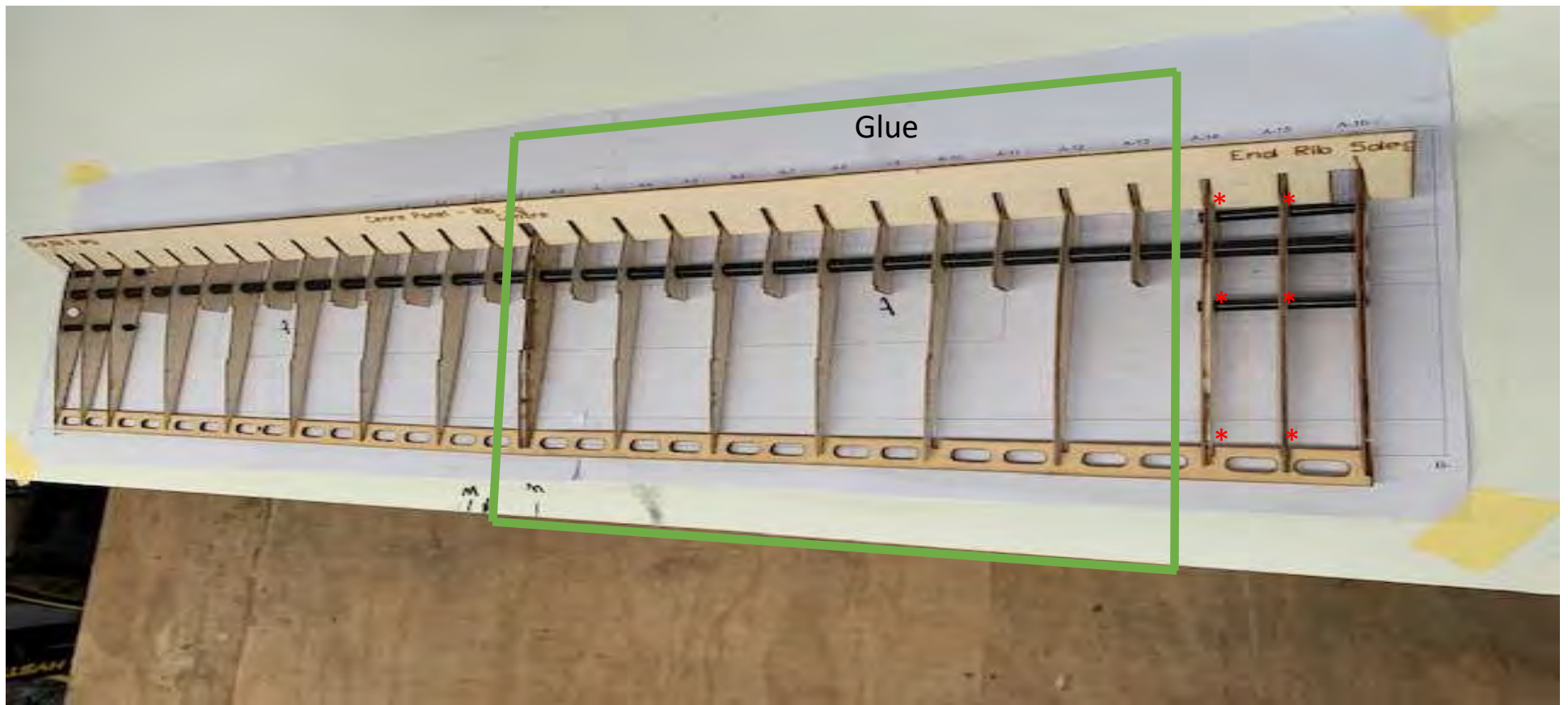
Remove the '6mm joiner' and glue the plug into the '7mm joiner tube' with medium CA.

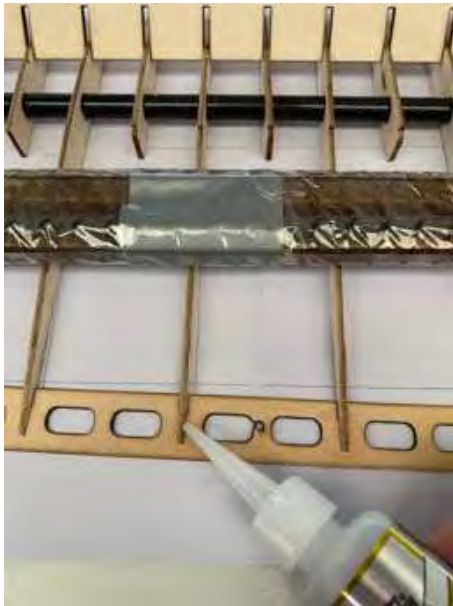
Note: If the '6mm joiner' is a loose fit in the tube then you can apply some thin CA to the '6mm joiner', let it fully dry and then fit again. Repeat if necessary. Alternatively, if the '6mm joiner' is too tight, then you can give the '6mm joiner' a light sand until it is a good fit. 90% of the time the fit is good, but you can get some natural production variation.



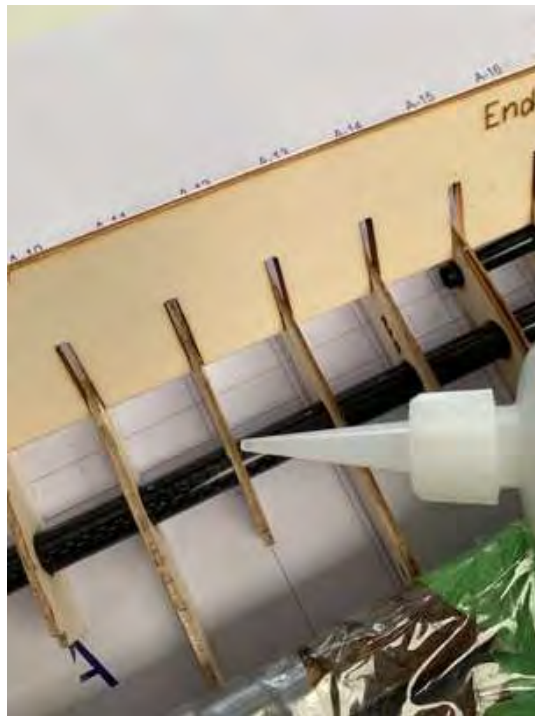
'7mm joiner tube' x 8 off

Slide the remaining ribs onto the spar and align over the plan. Add the LE, TE and joiner tubes. There is slight dihedral in the centre, so hold the RHS flat on the board with weights or pins. Use the rib template to align ribs. Apply thin CA to attach Ribs A1-A13, LE and TE. Tack glue the 6 locations shown with * and do not glue A16. Always hold parts flat on the board when gluing and ensure the glue is dry before removing.



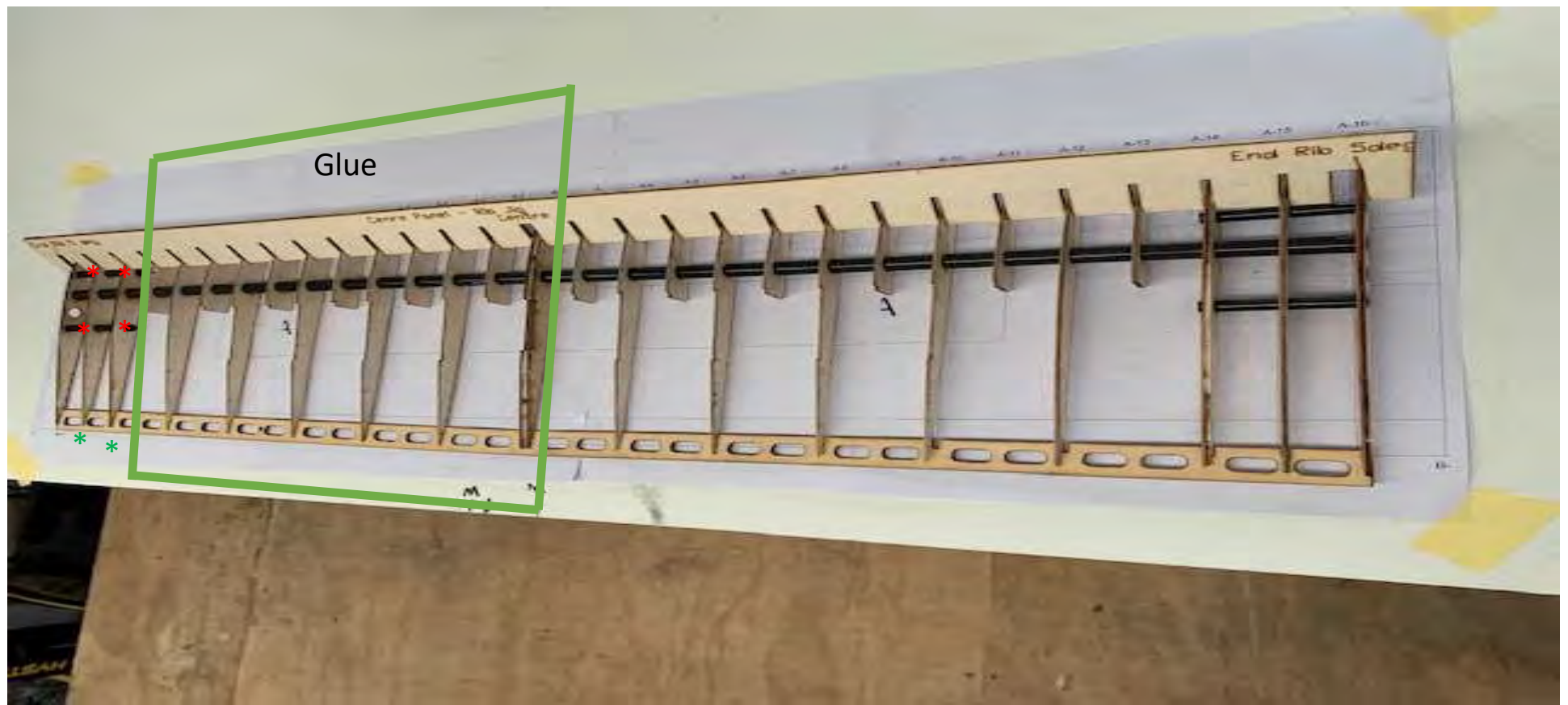


Plywood can be difficult to glue, so use thin CA and then medium CA for additional strength.



Glue the Spar. Use thin CA to wick into the balsa and then apply medium CA to form a fillet.

Now hold the LHS flat on the board and repeat the process used for the RHS assembly.



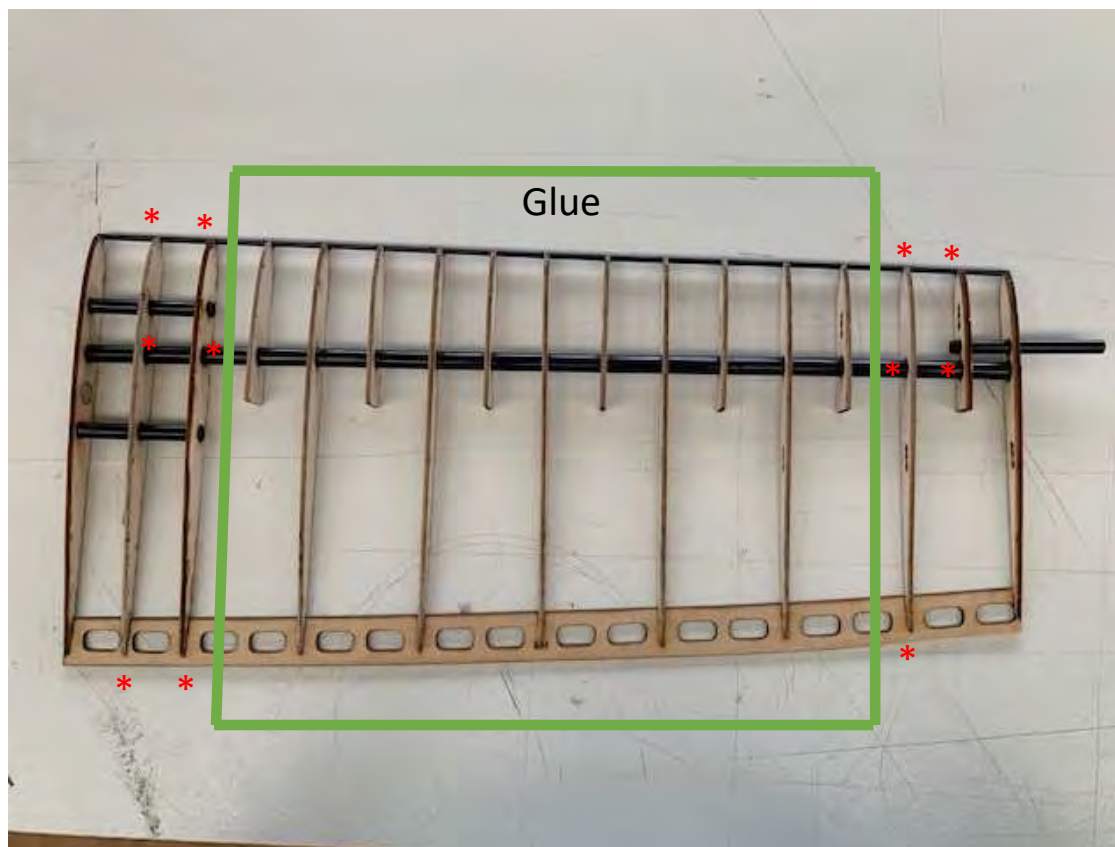
Build Tip Panel B

Slide the ribs in place and align over the plan. Dry fit the joiner tubes at both ends. Hold with weights. Use the rib alignment template (as used for the centre panel). Glue ribs B4-B15 in place on the spar, L.E and T.E. Glue the 11 locations shown with * but do NOT glue the ribs B1 and B17, just dry fit.

L.E. Diam. 3mm

Spar Diam. 8mm

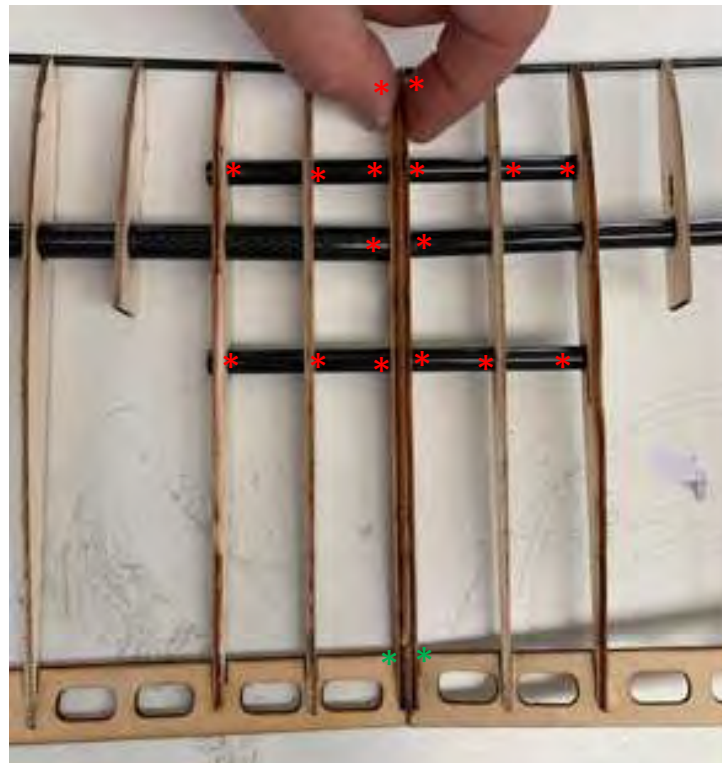
Joiner tubes
2 x 7mm x 58mm



Joiner tube
6mm x 64mm

Repeat for the LH Panel B

1. Slide Centre Panel A and the Tip Panel B together using the 2 x 6mm diam. x 104mm joiners.
2. The entire assembly should self align as shown.
3. Use the dihedral spacers (70mm) to hold the dihedral correctly.
4. Slide the panels apart again and check the tubes are fully engaged in the ribs. Adjust if necessary.
5. Slide the panels back together again. Repeat until happy.
6. Squeeze the 2 end ribs A16 and B1 together as shown until they are flush with each other. A small gap in the L.E or T.E. is OK.
7. Use MEDIUM CA, **not thin CA**, to tack the system in place, only glue in the locations shown *. This avoids glue getting into the joiners.

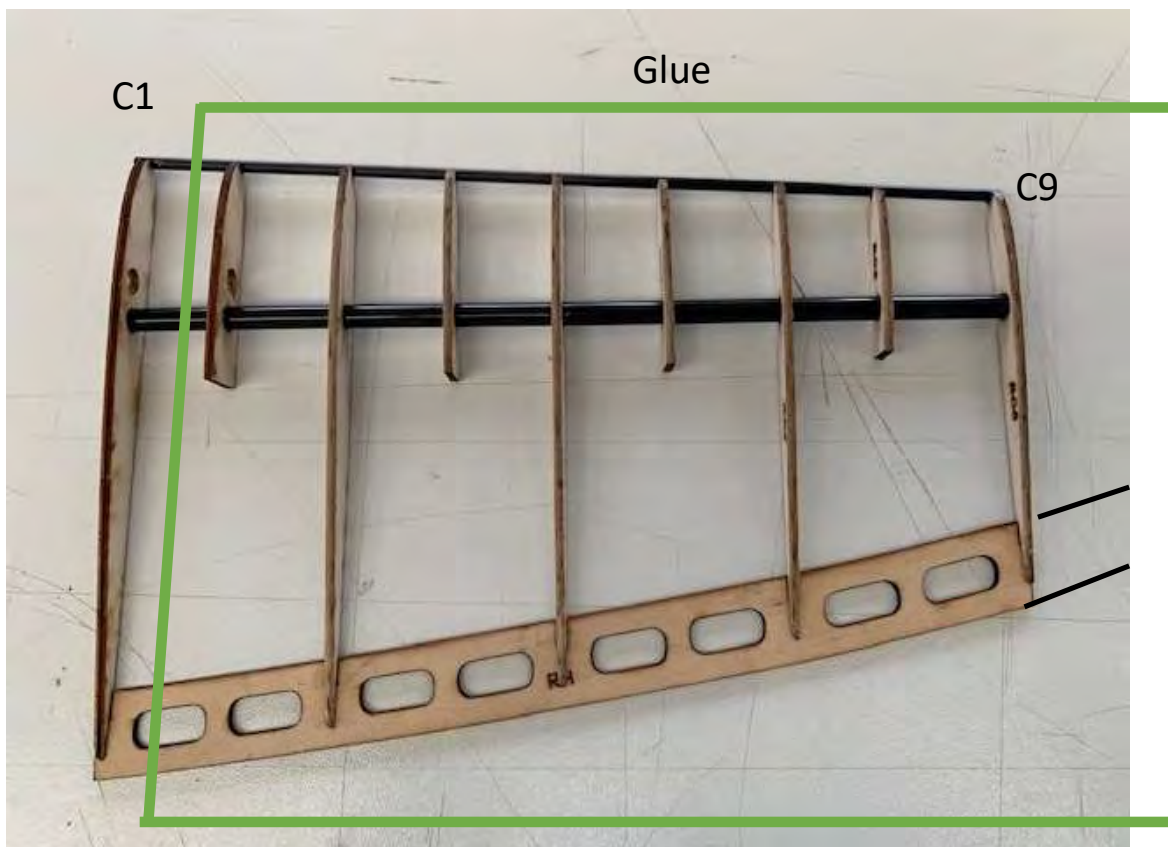


Note, for reference, the dihedral measurements are shown on the plan.

7. Allow to dry
8. Separate the panels and remove the joiners. Add more medium CA if required to the tubes and ribs for a good bond.

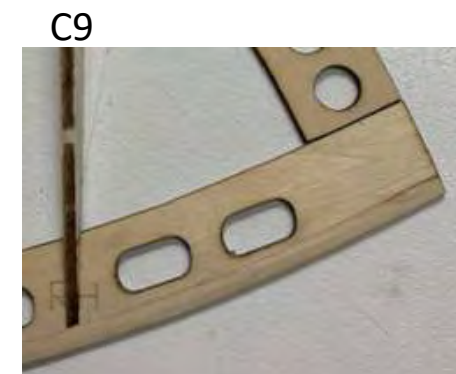
Build Tip Panel C

Slide the ribs in place and align over the plan. Use the rib alignment template (as shown on the centre panel) and hold with weights or pins. Glue ribs C2-C9 in place on the spar, L.E and T.E. Do NOT glue the spar to C1, just dry fit.



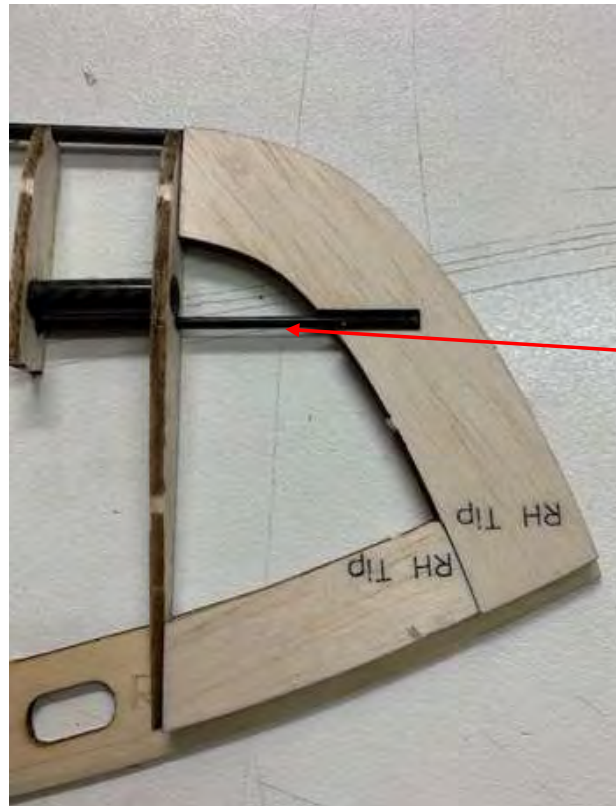
On the Medina the T.E. finishes at C9.

On the OZeRES the T.E. extends past C9 as shown below.



OZeRES 2 wing tip construction

First add the ply tip and glue in place. It sits flush on the building board.



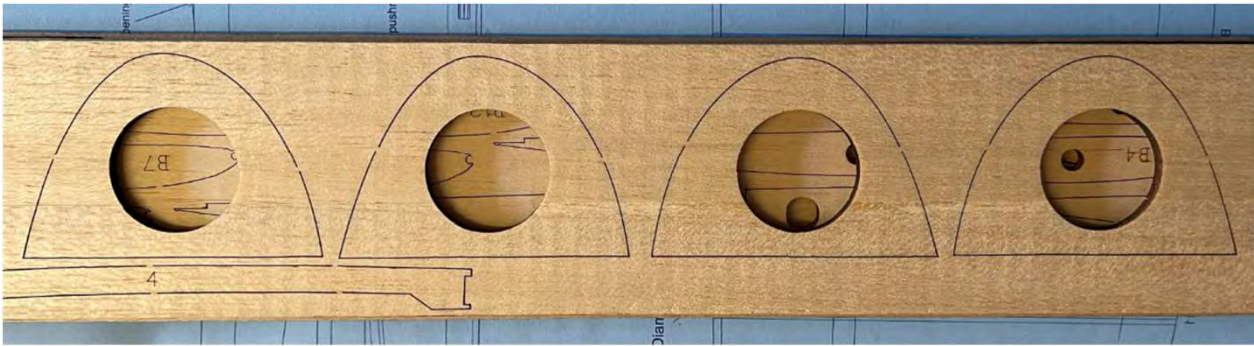
Add the supplied carbon rod

Add the 3mm balsa pieces as shown.

Sand the tip to shape.

Medina wing tip construction

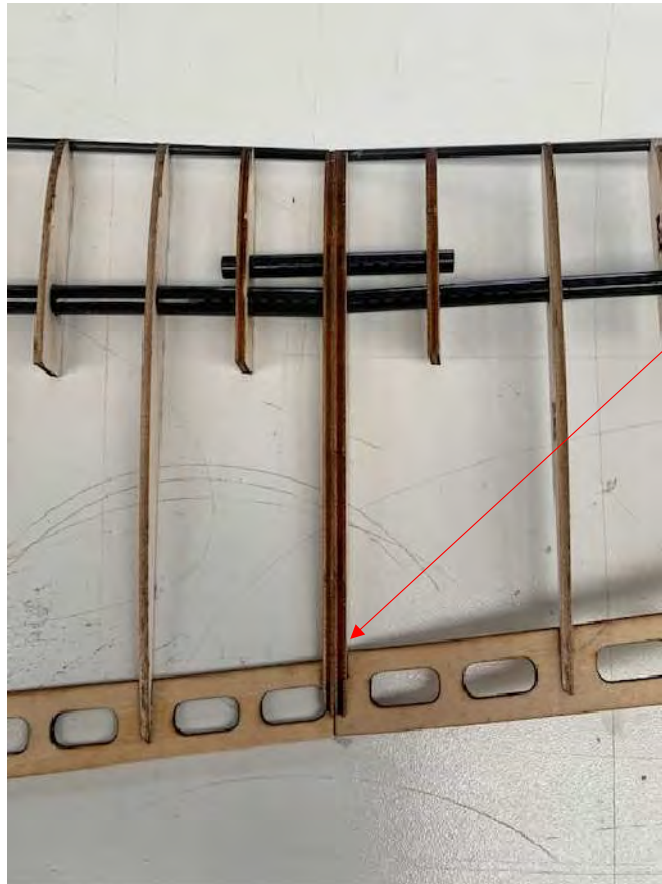
There are 4 tip shaped blocks. Glue 2 together for the RHS and 2 together for the LHS.



Glue them onto the end of rib C9 and sand the tip to shape



1. Slide Tip Panel B and Tip Panel C together using the 6mm diam. X 104mm carbon tube.
2. The entire assembly should self align as shown. Use the dihedral template (46mm) at the very tip of the wing to ensure the dihedral is correct.
3. Squeeze the 2 end ribs B17 and C1 together until they are flush with each other.
4. Slide the panels apart again and check the tubes are fully engaged in the ribs. Adjust if necessary.
5. Apply medium CA between B17 and C1 and slide the panels back together again. Hold until dry.
6. Glue all locations



Note, for reference, the dihedral measurements are shown on the plan.

Glue all the triangle support pieces and rectangular support pieces as shown on the plan.

These add significant stiffness and strength to the wing.

They also prevent the covering from distorting the end ribs.

Repeat for the left hand wing panels.



Glue in S RH and S LH in the wing. These will need to be trimmed to size for a good fit. These stop the wing rocking on the fuselage.



Shave the height of S RH and S LH to be flush with the bottom of the wing.



Turn the wing over and drill the hold down bolts at the front and rear

OZeRES only - Add magnets to the end of the centre panel and tip panels ensuring the magnets are in the correct orientation for attraction.



Add the supplied supports at the end of the centre panel and end of the tip panels. This prevents the covering from distorting the end ribs



Covering

If you are using a transparent or clear covering film then you can wipe about 50% of the burn mark from the ribs using a microfibre cloth. You can also give the entire wing a light sand with a 300 or 400 grit sandpaper on a long sanding block to remove the remaining burn marks.

When covering, wrap the film from the T.E. around the L.E. and back to the T.E.

Do not apply the iron to the carbon L.E. or the film may not shrink properly around the L.E. edge afterwards.

Nick Chitty has an excellent OZeRES covering video on Youtube – thank you Nick!

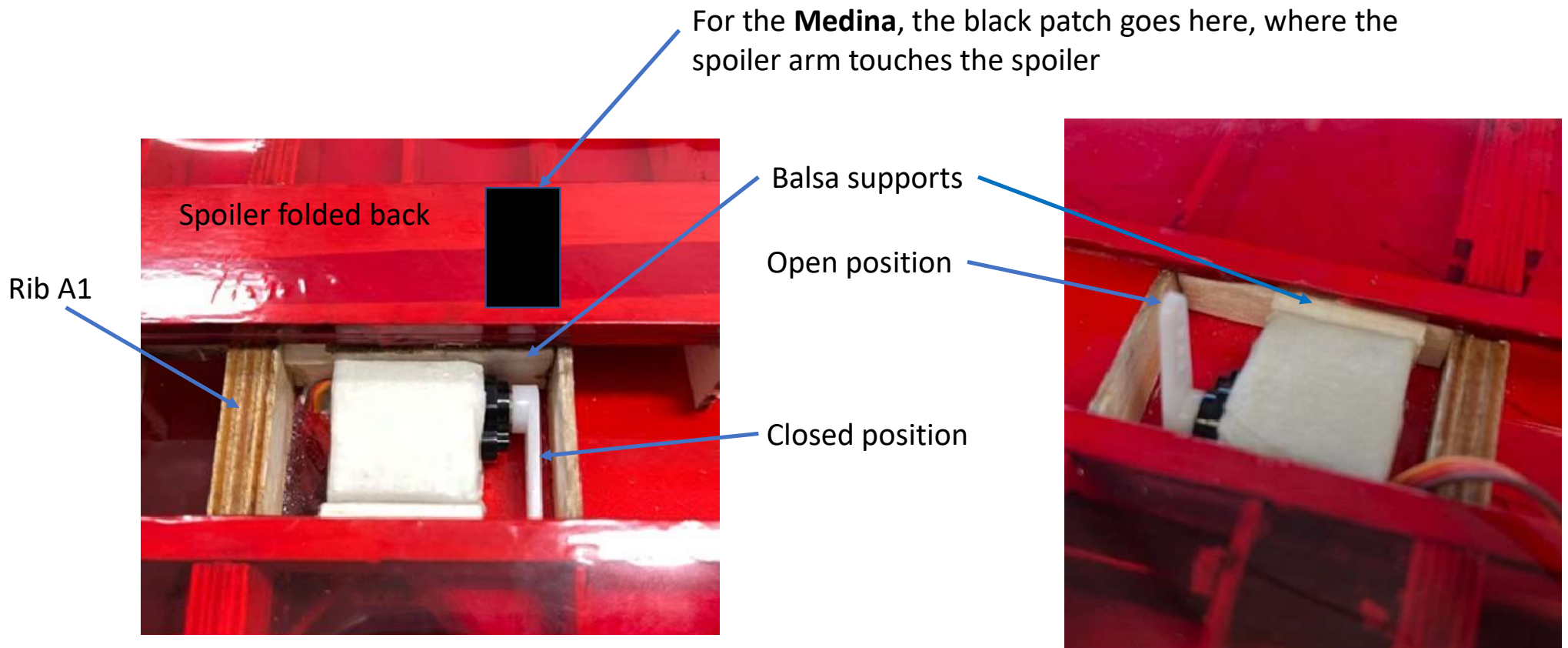
Tack seal all edges on medium heat first.

Then seal all the edges with high heat.

Then carefully shrink with the base of an iron or a heat gun set on low. Move carefully and apply minimum heat to shrink the film to the final shape.

Spoiler Servo Installation

Thin spoiler servos can be mounted on the supplied spoiler plate. However, if a MKS113MG or similar 12mm thick servo is used then the spoiler plate is discarded and balsa supports are made using scrap balsa as shown. Remove the mounting tabs from the servo and wrap the servo in 2 layers of masking tape and CA in place. Ensure the servo arm is in the correct position for closed and open positions.



OZeRES 2 - Tie 2 x supplied rubber bands into approx. 2/3 and 1/3 loops. Cut and discard the 1/3 loop.

Medina - Use the rubber bands supplied.

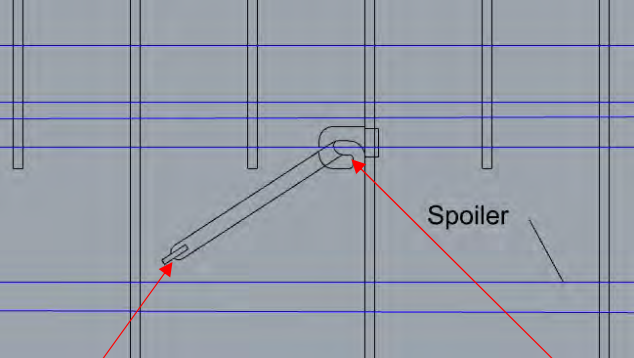


Discard

This shows the LH rubber band position with the spoiler open. Only light tension is required when closed.

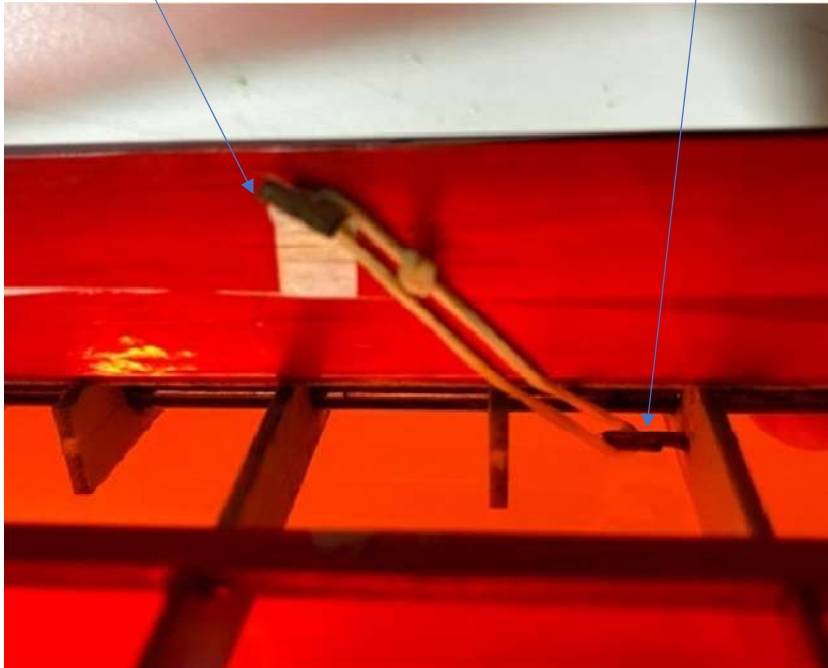
Repeat for RHS side

Plan view, spoiler closed. LHS shown.



Spoiler Hook 1

Spoiler Hook 2



Fuselage Assembly



Glue the 1.5mm ply reinforcements to the fuselage.



Glue the 5mm square spruce pieces in place, top and bottom.

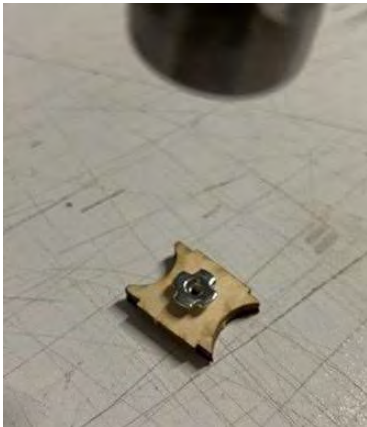


Glue the magnet into F2.

Attach the T nut to the 'Front hold down former'



1 Prepare the pieces.



2 Apply glue between the ply pieces and to the T nut.

3 Hammer the T nut in place from the bottom side.

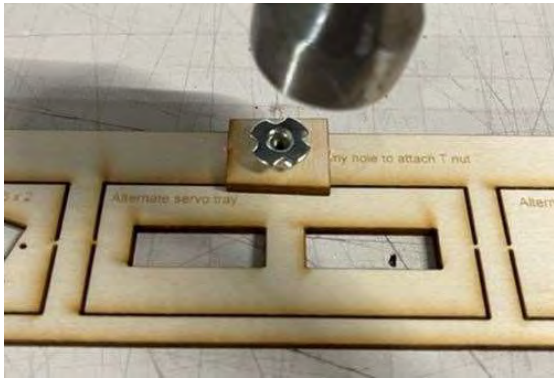


4 This is the top side.

Attach the T nut to the 'Rear hold down former'



1. Use the dummy hole



4. Hammer in the T nut



2 Line up the rear former



5. The T nut passes Through the former



3. Apply thick CA or Epoxy then line up the T nut

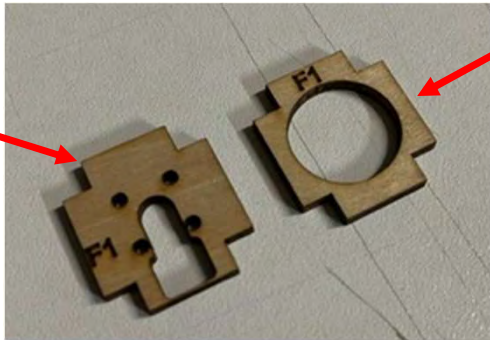


6. Cut off the T nut that passes through the former with a hacksaw blade

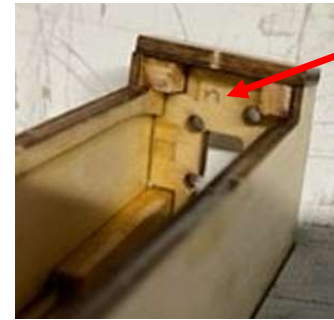
Attach Fuselage Formers

It is important to select an F1 former option to suit the bolt pattern of your motor.

Armsoar T motor
F1 former



Medina RES glider
F1 former



LDARC 1806 motor F1
former.

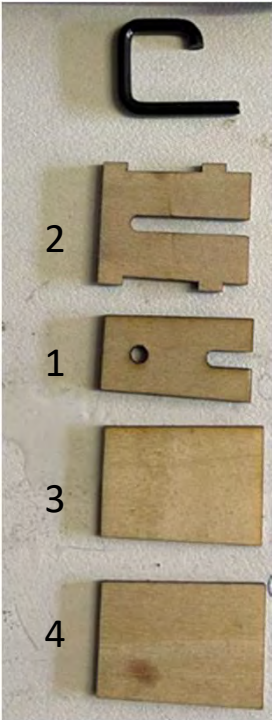
Note this F1 is handed and
the 'IN' marking must face
inside the fuselage



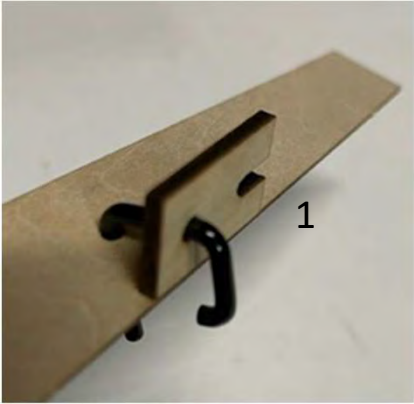
Glue formers F1, F2, F3, F4 and the 'Front hold down former' in place on one side of the fuselage.

Medina RES Glider Version - Towhook

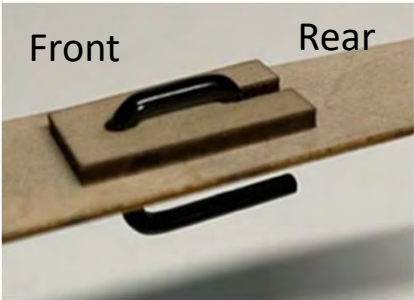
Before assembling the fuselage further, build and assemble the towhook.



These are the pieces required

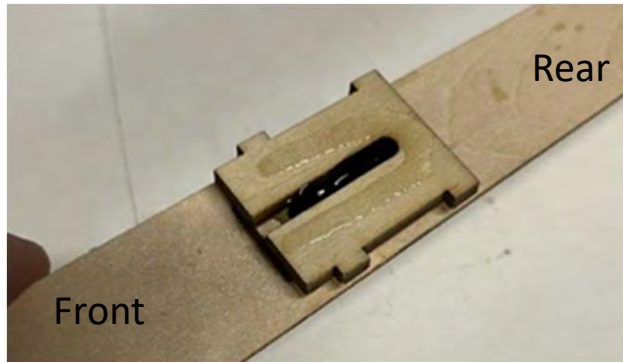


Insert the towhook through piece number 1 and then sideways through the floor of the fuselage. Twist into position.



Glue piece 1 in place on the fuselage floor.

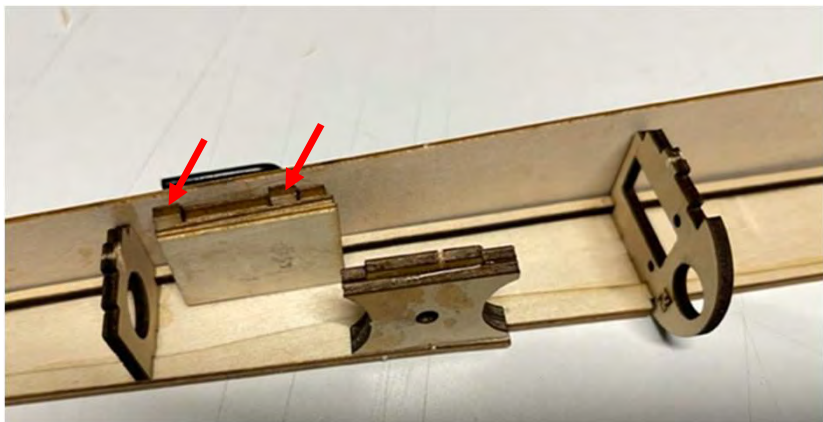
Medina RES Glider Version - Towhook



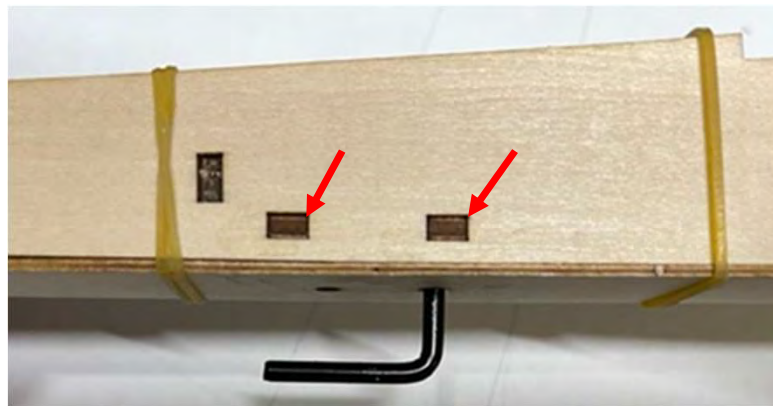
Glue piece 2 in place in the correct orientation shown.



Glue pieces 3 and 4 in place.



Insert the towhook assembly onto one side of the fuselage.

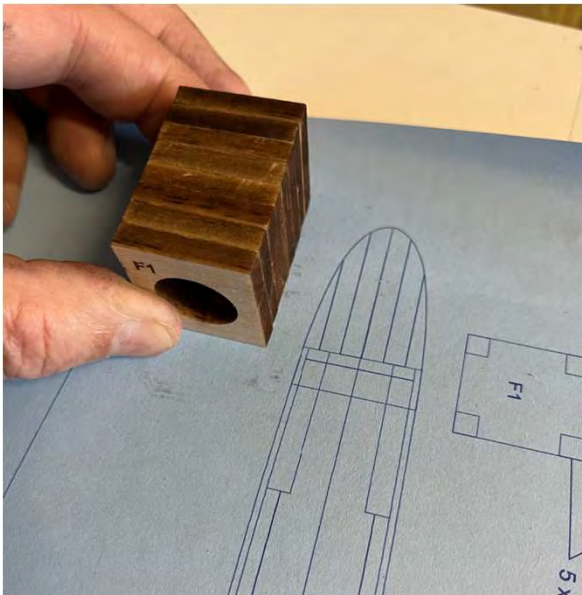


Glue the other fuselage side and fuselage floor in place. Hold in place with rubber bands or masking tape. The floor ensures the correct fuselage alignment.

Medina RES Glider Version – Nose cone



Glue the 2 x ply pieces above F1



Glue on the nose cone blocks and sand to shape.
The kit will have either be cross section pieces or length wise pieces to make the nose block.

Nose weight can be placed inside the nose cone.

OZeRES 2 and Medina Electric Version.

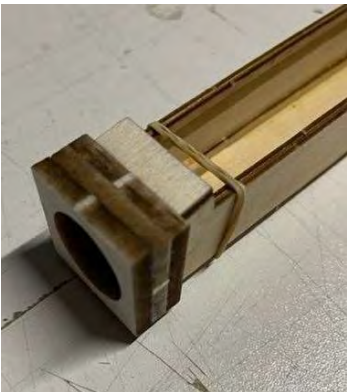
Assemble the fuselage



Glue the 2 x ply pieces above F1

Use medium CA to glue on the other side of the fuselage and the fuselage floor. The floor ensures the correct alignment of the fuselage. Use rubber bands or tape to hold everything in place while the glue dries.

Do NOT glue in the servo tray, use it to hold the fuselage sides to the correct shape.



Glue the 3 x nose cone piece together at 90 degrees to each other.

Temporarily fit the motor to align the nose cone pieces.

Glue the nose cone pieces to the front of F0 so there is an even gap around the perimeter of the motor.

Finish the Fuselage



Add both thin CA and then medium CA inside the entire fuselage for extra strength

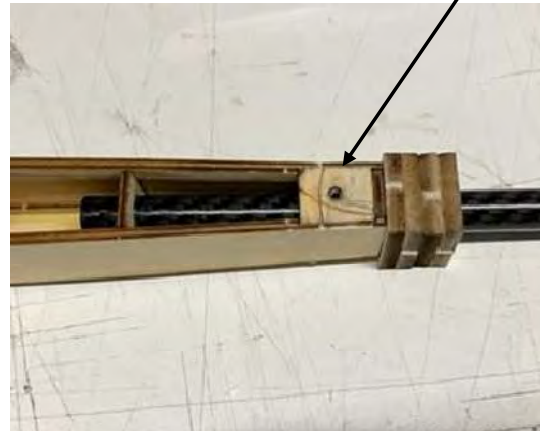


Glue the balsa fairings in place



Glue the canopy pieces together in order from 1 to 6. Ensure they are square.

Add the magnet to the rear of the canopy. Ensure the magnet is in the CORRECT orientation so it attracts to the magnet in F2



Glue in place the rear hold down former

Glue the 4 x tail piece together at 90 degrees to each other.

Temporarily fit the tailboom.

Glue the 4 x tail cone pieces to F4. Be careful not to glue in the tailboom. Remove the tailboom.



Sand the fuselage to shape



Medina Tailboom V Tail Drilling

The carbon boom length is 730mm and may require drilling to fit the joiner rods to the correct angle.

See the instructions for constructing the '**V tail drill jig**' on the Medina/Armsoar website.

<https://www.armsoar.com/collections/gliders-1/products/medina-2m-balsa-f3l-f5l-kit>

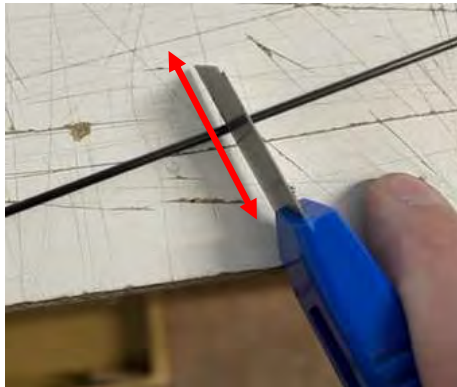


Note: If your kit comes with the tape on the tailboom then the boom has been pre-drilled.

Tailboom and V Tail Assembly



The boom length is 730mm and the 2mm holes for the carbon joiners are pre-drilled. The oval marked on the tape is the **top** of the tail boom. **This is important to get the correct V tail angles.** Open up the hole marked on the tape. This is for the pushrods or pull/pull cables to exit.



Cut the 4 x V tail rods to length using a rolling motion with a blade. Remove any burrs.

The 2 x front rods are **40mm** long and the 2 x rear rods are **55mm** long.

Insert the V tail carbon rods into the tailboom. They should protrude 1mm through the other side of the tailboom.

Glue in place with thin CA.



Pushrod
opening

OZeRES 2 V Tails



Trim the 0.6mm plywood strips to length.

Place the tailplane on a sheet of glad wrap or plastic.

IMPORTANT - Press the ply strips down so they are flush with the bottom surface

Apply thin CA to fix them in place.



Cut the aluminum tubes to length. **30mm** for the front tubes and **45mm** for the rear tubes.

Cut using a rolling motion with a blade (like the 2mm Carbon). Smooth the ends of the tubes and remove any burrs with a file. Test fit on the carbon v tail rods.

Rough up the tubes and apply thick CA to the tubes.

Press into position and add the top 0.6mm plywood pieces. Add thin CA to glue the ply in place.

OZeRES 2 V Tails



Sand both sides of the TE of the elevator so the T.E. is 1mm thick.

Sand the L.E. round.

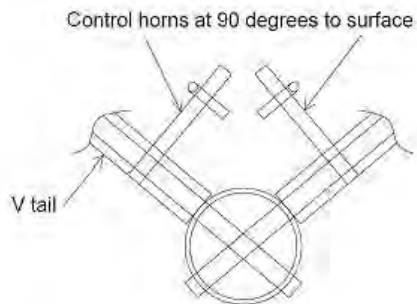


Place a drop of CA on the pivot point of the V tail horn, and once set, drill out with a 1mm drill bit.



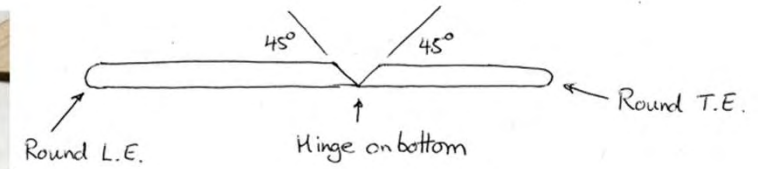
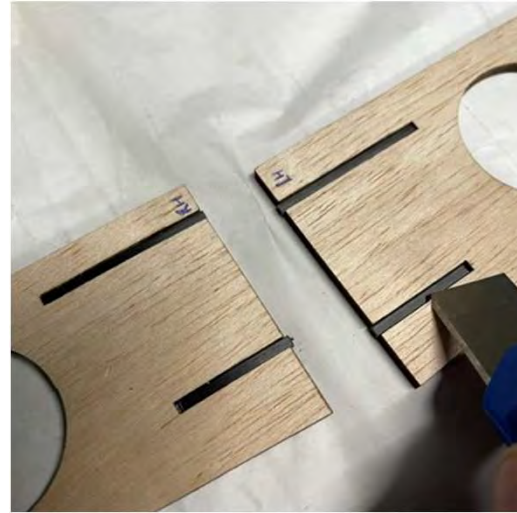
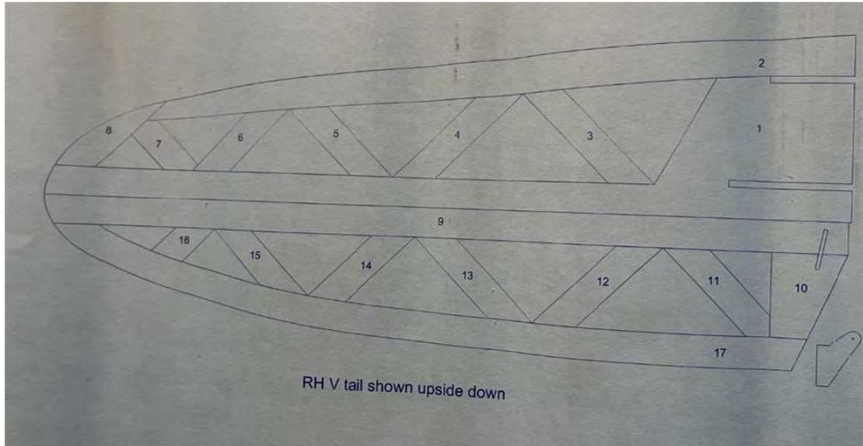
Install the servo horns into the V tail at right angles to the surface. This can be done after covering to make a neater finish.

Do not shorten the V tail horns for visual reasons. Having a short servo arm and long V tail horn is essential for good control and resolution and gives improved handling characteristics of the plane.



Medina V Tails

Note, the Medina uses a pull/spring system to activate the V tails.

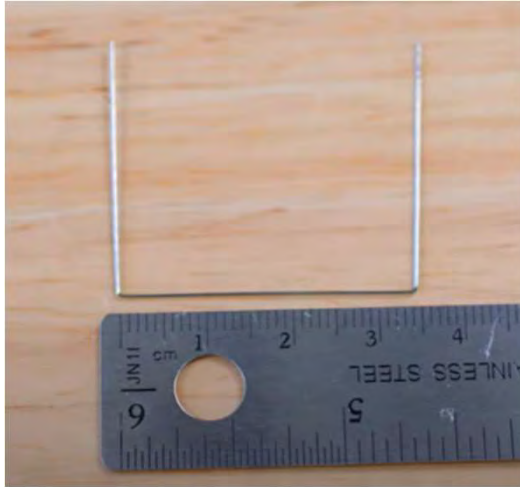


Place some protective film over the plan and glue the v tail balsa pieces together as shown on the plan. Note, there is a RH and LH plan to allow for the offset fuselage joiners. Make sure you mark RH and LH on the v tails.

Insert the square Carbon joiner tubes and CA them flush with the bottom surface of the tails. Hold them in place until the glue is dry. Use some scrap balsa to fill the gap on the top surface and sand smooth.

It is also important to hinge the v tails on the bottom surface to ensure the springs can be inserted in the correct orientation.

Medina V Tails



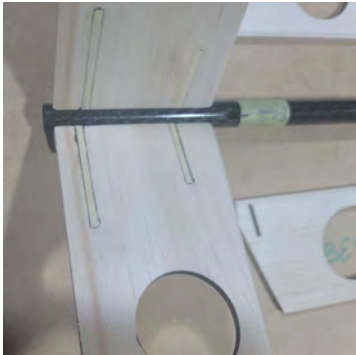
Bend the 2 x springs as shown



Insert 1 spring in to the RH V tail as shown. The other spring goes into the LH V tail. Add CA to glue the spring in place. Once covered install the control horn

To finish the pull spring system, you can follow the installation procedure shown on the youtube video “Medina ARF 2 Meter RC F3-RES Glider Build Log” to complete the pull wire installation.

Finish the Fuselage



Insert the V tails onto the boom



Slide the tailboom into the fuselage pod until the boom is 10mm past F3. The boom is 730mm in length.

Attach the wing to the fuselage.



For correct alignment, sight down the front of the fuselage tilting it upwards until both V tails disappear behind the wing at the same time. Adjust the rotation of the boom if needed until square.

Alternatively, you can set the plane up on the bench with the wings level and measure the height of each V tail. Adjust until both are the same height.

Once happy, run a small amount of CA into the tail cone to tack the boom in place. Remove the wing and glue the boom permanently into the fuselage at F3 and F4.



Drill through the rear T nut with a **2.5mm** drill bit to make clearance for the rear hold down bolt to pass into the tailboom.

OZeRES 2 Pushrods



Bend the 1mm wire into a L shape 20mm long x 6mm wide.
Sleeve the carbon tube and wire with heatshrink tubing.
Add a small drop of thin CA at each end of the heatshrink tubing.
Apply heat to the heatshrink tubing until it is a tight fit.
CA should ooze out both ends.



For both pushrods, assemble one end of the pushrod only.

Bevel or round the end of the wire so it does not damage the control horn when inserted.



Slide the Carbon pushrods and plastic pushrod tubes into position.

Hook the pushrods into the V tails. The natural flex of the pushrods should hold them in the V tail horns. Check this is the case and adjust if necessary.

Once assembled as shown, glue the pushrod tubes into the tailboom.

Tape the V tails onto the tailboom on the underside of the tailboom. This ensures they are secured for flight.

Medina Pull Spring Installation

Feed the supplied cable through the opening in the tail through holes in F2 and into the servo compartment.



Pass the wire through the aluminum tube crimp, through the shortest servo arm hole and back through the aluminum tube crimp.
Crimp the aluminum tube hard with pliers and also place a small drop of thin CA on the crimped wires.



Form the same loop through the V tail horn.

Ensure the spring is installed in the V tail and the servos are switched on and the servos are in their neutral position.

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Medina Pull Spring Installation



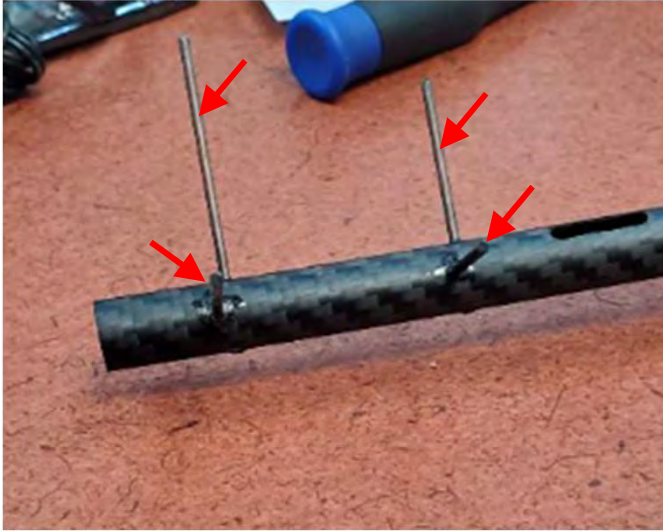
Pull on the loose end of the pull cable until there is about 2mm of up elevator relative to the stabilizer. This allows for some spring back after assembly and reduces the amount of sub trim required to neutralized the surface.



Crimp the aluminum tube hard with a pair of pliers.
Add a drop of thin CA on the crimp for extra security.
Trim the excess pull cable.

Use the supplied V tail gauge to sub trim both RH and LH V tails to zero.

Medina Pull Spring Installation



If needed, you can tighten the fit of the V tail rods in the V tails by applying a drop of thin CA to the rods and then use a piece of grease proof paper or baking paper to spread the drop of CA evenly over the rod.

Allow to fully dry.

Test fit the V tails and repeat if required until you get a nice fit.

If the rod is a little tight, then gently sand with some 300 grit sand paper to get a nice fit.

Tape the V tails to the tailboom on the underside of the tailboom. This ensures they are secured for flight.



Install the motor, battery, receiver and dry fit the servos until the C.G. is at 78mm (the most rearward C.G). Move the servos backwards and forwards to find the ideal position. When set, glue in the servo tray and complete the pushrods in the same way as the tails.

Use the inner most servo horn holes for good torque and resolution of the V tail. This is important for good flight characteristics.



Glue the plastic pushrod tubes at the front end of the tailboom.
THIS IS ESSENTIAL TO STOP SLOP IN THE V TAILS.

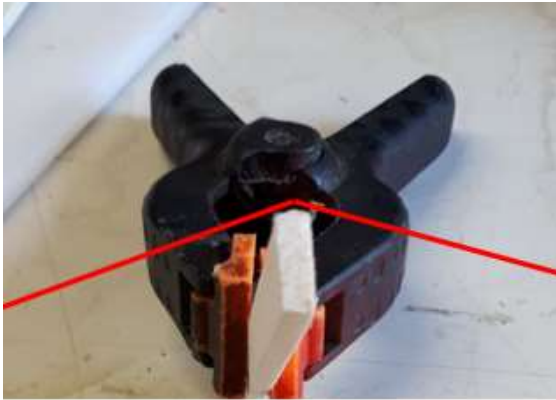


Typical installation example. The ESC can sit on the fuselage floor under the battery.

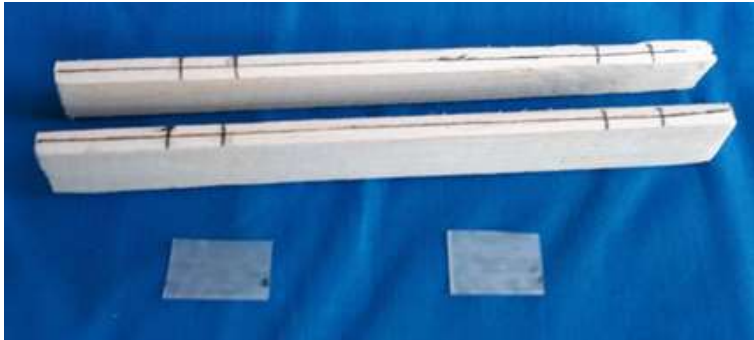
Further Medina finishing information can be found on the youtube video “**Medina ARF 2 Meter RC F3-RES Glider Build Log**”

OZeRES 2 - Optional method for hinging the V tails.

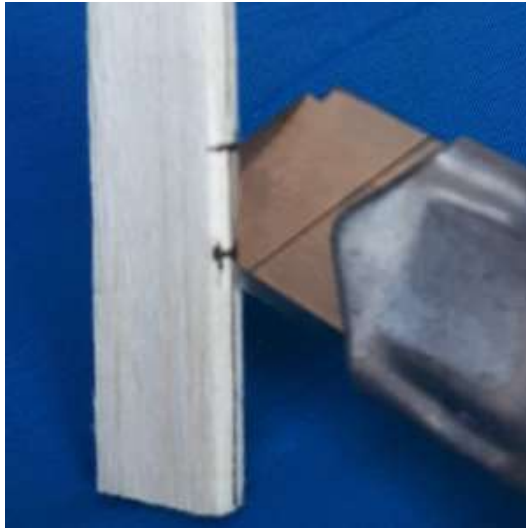
Use 4 hinges on each of the ruddervators.



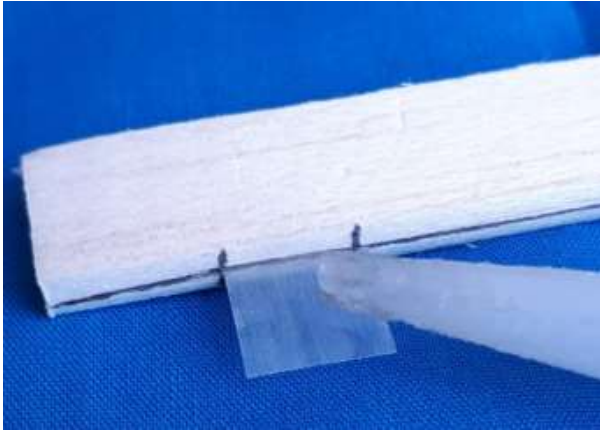
Bevel edges of balsa to allow for hinge movement



Mark the centreline and hinge positions.
Cut supplied mylar hinges 10mm wide x 15mm long.
Sand lightly with 400 grit.



Cut slots 5mm deep (half the width of the mylar) with an 18mm snap off blade style knife



Glue the mylar into one side of the job using 1 drop of thin CA on the top and 1 drop of CA on the bottom.



Once dry, trial fit the other side of the surface.



Flex the hinge to allow for movement. This will create a 1-1.5mm gap.



Glue the hinge in the other side of surface with 1 drop of CA. Remove excess CA with the edge of paper towel.

Turn job over and complete the same process for the other side.

Now you have a nice strong, flexible hinge

Motor, prop, spinner, ESC

The recommended motor is the Armsoar 1806 motor with pre wired ESC.

The recommended spinner is the CN models 25/5/19 which has a 25mm OD.

The recommended propeller is the CN models 6x4 and is ideal with a 3s battery.

This combination pulls approximately 200 watts and 18A.

The maximum battery cross section that can fit in the nose is 21mm x 21mm

Finishing

Place a small rubber band, or tie off some hat elastic, around the folding propeller to ensure it folds against the side of the fuselage. This prevents it hanging in the breeze when flying. See this video

<https://www.youtube.com/watch?v=HjuCuHo8oZc&t=21s>

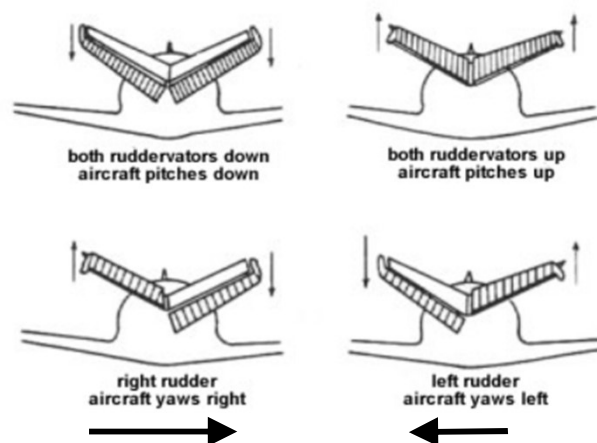
Starting Setup

Apply tape to secure the wing tips in place and to secure the V tails.

The V tail total throw (limit) is +/- 25mm for each V tail. The Elevator throw is +/- 15mm. The Rudder throw is +/- 15mm.

I like to run 30% Exponential on both Rudder and Elevator to give a slightly smoother response in the middle of the stick.

Check all your control movements are in the correct direction before flying.



Balance the model at 75mm from the L.E. of the wing. This is a good all-round C.G. for float and penetration.

For very windy conditions I like to move the C.G. to 60-70mm from the L.E., but please experiment and find your own ideal settings. Some small amount of elevator retrimming is required as the C.G. moves forward.

The further forward the c.g. the better the natural penetration of the glider, but the worse the float performance.

Ballast

Ballast is very important in windy conditions and improves penetration.

Ballast can be added in the centre spar for windier conditions. Remove a tip panel, add/remove ballast and re assemble. Use a combination of 10mm diam. Galvanized Steel and Aluminum rods cut to 100mm lengths. Locate the steel rods over the middle of the wing. The Aluminum rods are just spacers so other materials like balsa can be used.

These combinations keep the steel rods in the middle of the wing. From tip to tip the combinations are:

1. For 60g ballast use 3xAl, 1xSteel and 3xAl for a total of 7 rods.
2. For 120g ballast use 2xAl, 1xSteel, 1xAl, 1xSteel and 2xAl for a total of 7 rods.
3. For 180g ballast 2xAl, 3xSteel and 2xAl for a total of 7 rods.

This also moves the C.G. forward to 72mm so some minor elevator trimming is required for this C.G., but the result gives excellent penetration and performance in the wind. Higher ballast combinations can be used if needed, again experiment.

Enjoy!

I hope you enjoy flying your Medina/OZeRES 2!! For any feedback or questions please email Marcus at performance@mailzone.com