FXj 2.5

We are pleased that you have chosen to build the FXj 2.5m, a quality Sailplane kit made in Austria.

Read these notes carefully before starting construction and proceed step by step during the build.

General information about the model:

The kit, and also the flight characteristics have been designed with the more experienced modeller in mind. Experience in handling wood and the various adhesives is necessary for the successful completion of this kit.

Unlike previous RS-Aero models, FXj 2.5 is not an evolution of earlier designs but a completely new model designed from the outset for flying in the f5j-400 class or, f3j with a Hi Start or winch launch.

The model is equipped with a detachable horizontal stabiliser and is controlled by rudder, elevators as well as ailerons and flaps.

The design of the model delivers pleasant handling combined with excellent thermal sensitivity. Using the wing flaps in “Thermal Mode” i.e. flaps lowered by a couple of degrees (coupled with ailerons if your Radio supports it) means thermal turns as tight as 5m diameter are easily achievable!

In “Butterfly” or “Crow mode” a 70° angle of descent at walking speed into a light wind, is possible.

Fans of electric aviation can also equip the model with an electric motor. The model is designed to take a **HACKER A10-7L** with gearbox.

It is also possible to install a **28mm** motor with the enclosed alternative parts.

The wing profile chosen for the FXj is AG36. Due to the flat bottomed profile, no special jigging is required for building the wing.

Thermal flying after launch with a Hi-Start (Bungee), the winch, or even on the slope, is a lot of fun with this robust and powerful model.

The experienced and performance-oriented pilot will quickly appreciate the versatility, enormous gliding performance and pleasant flight characteristics of the FXj.

The conventional two-piece D-Box wing is built with Pine spars and Balsa planking,. The first dihedral step is reinforced with a plywood tongue. This results in a rigid, and torsion-resistant wing, which easily copes with launching and flying loads.

With the polyhedral wing, turning performance is optimised and the two-part wing design makes the model transport-friendly.

The fuselage is of pure wood construction, reinforced where necessary. Depending on your preference, this can be sanded more or less round.

The installation of the RC components is optimised so that no matter which drive battery is used, the centre of gravity (CofG), is virtually constant but can be adjusted by moving the drive battery. Only the flying weight and consequently, the wing loading increases when using larger flight batteries.

The horizontal Stabiliser is removable, which further improves the ease of transport. Damage during transport is therefore unlikely!

Required tools:

Craft Knife or Scalpel, 120 + 240 grit sand paper (supplied in the kit), fine saw, Modelling pins,
Clothes-pegs and clamps.

Adhesives:

Thin and Medium Cyano, PVA or Aliphatic Resin, 30min epoxy resin. (My personal preference is Deluxe Materials Super Phatic, a great substitute for both CA and PVA!).

Model design:

The model structure and the instructions are designed in such a way that the model can be built by less experienced model builders without any major difficulties.

However, it is not recommended as a first kit! Some construction experience and also flying experience is desirable.

The laser cut parts are easily removed from their carrier sheets by cutting the joining tabs with a scalpel or similar blade. The scorch marks left by the laser cutting process can be gently sanded off to obtain better bonding with other components if you wish.

Note: If you choose to do this, be careful not to alter the profile of parts, especially wing ribs!

To build the model, a straight, flat construction board of about **1.5m x 0.50m** is required. Angle templates are included for setting the dihedral angle of tip and root ribs.

Tip: In order to prevent the components from sticking, cover the plan with the enclosed self-adhesive book binding film where assemblies are going to be built over. Even CA does not stick to the film so parts are easily removed without damaging the plan.

For large-area bonding, such as gluing the fuselage doublers onto the fuselage side walls, wood glue is preferred. To do this, apply the adhesive to the component, press it in position after precise alignment, fix it with pins or weights and let it harden. Remove excess glue with a damp cloth before it can harden.

The wing is built up in 6 parts. In order to obtain the correct dihedral angle , templates are provided for aligning the end ribs of each panel. The wing panels are glued together with a plywood joiner tongue or butt joint. The wing joiner is made of a 5mm spring steel dowel. The corresponding aluminium sleeves are installed in both halves of the wing.

The test model was covered with Oralight transparent and opaque. The choice is yours.

In order to be able to better distinguish the individual types of wood on the blueprint, the plan was plotted in several colours. All Balsa parts were shown in **BLACK** and all plywood or Pine strips are shown in **BLUE** or **GREEN**. The remote control components as well as the mechanical steering parts are drawn in **GREY**.

I hope you have a lot of fun building this model. If there are any insurmountable hurdles, you can always reach me at my e-mail address
info@rs-aero.com

Required accessories:

Drive variant 1: **HACKER A10-7L** with gearbox
Spinner 30mm diameter
13x7 folding propeller
Controller with 20A continuous power and at least 2A BEC
Drive Battery - Turnigy 3s1000mA or 3s1200mA (slim)

Drive variant 2: **JOKER 2830-9.5**
Spinner 34 or 35mm diameter
10x6 folding propeller
Controller with 20A continuous power and at least 2A BEC
Drive Battery - Turnigy 3s1000mA to 3s1450 (Hacker slim)

4 wing servos e.g. Graupner DES-427, DES-428 or TGY-5252mg
2 fuselage servos e.g. Graupner DES-427, TGY EX5201 or HS-45
7 channel receiver
Approx. 3m covering film (Oralight or similar).

Preparatory work:

There are a few tasks that are best carried out before building proper commences.
Secure the construction plan on the building board with drawing pins. Cover the parts of the plan where building will take place, with the self-adhesive film provided.

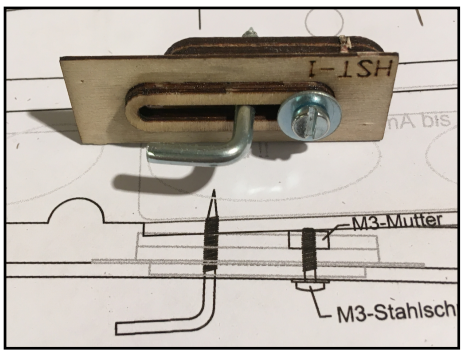
Tip: Wipe any excess glue away from the joints, edges, corners and beading when wet. This is much more difficult when cured and the components may not fit properly into the intended position.

The individual strip-wood is already cut to length (with a slight excess). Bundled and labelled ready for use.

Fuselage:

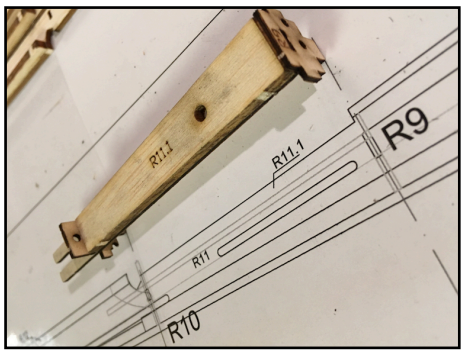
Glider Version:

Glue the adjustable tow-hook backplate **HST-1** and **HST-2** as well as the holder **HST-3** and **HST-4** from the plywood parts. Press the **M3** nut into the prepared recess and fix it with second glue.



If you are building the Glider version, glue the nose block together from the Balsa parts **RN1** and **RN2**.

Glue the two parts of the wing bolt mounting plate parts **R6-1** and **R6-2** together with the **M4** nuts. Before gluing the nuts into their pre-cut slots, thoroughly roughen the nut on the outside and glue them in with medium CA.



Glue the doubler **R11** to the Stabiliser mounting plate **R11.1** and glue the **M3** plastic nut into the prepared opening.

Note: Check the orientation of R9 and R10 is correct against the picture. This is critical when the time comes to slide the Bowden cable outers in place!

Radio Hatch:

Build the Radio Hatch from the parts **RD1, RD4** and **2x RD5** together. Glue the locking device provided in the hardware pack into the prepared recess and glue a remnant of 0.8 plywood over it to lock it in place.

Glue the two **RD-2** components together and **RD-2.1** centrally on the underside. Then glue the plywood parts **RD-2.2**, flush either side of **RD-2.1**. This should now result in a slight curvature of the hatch lid. Finally, press the L-shaped latch assembly into the slot in **RD-2.1**. Secure it in place with a drop of medium CA. Avoid getting glue on the wire latch! Stick a small rectangle of scrap **0.8mm Ply** over the assembly on the underside to prevent the latch bolt falling out with use.

Tail Plane Construction:

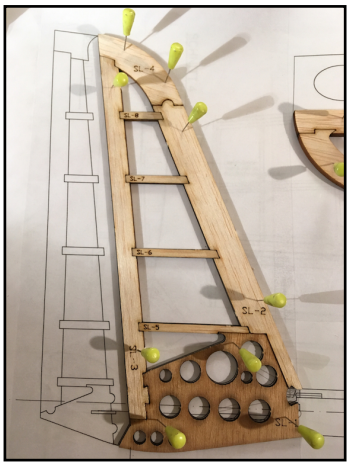
Stick the self-adhesive film over the corresponding sections of the plan.

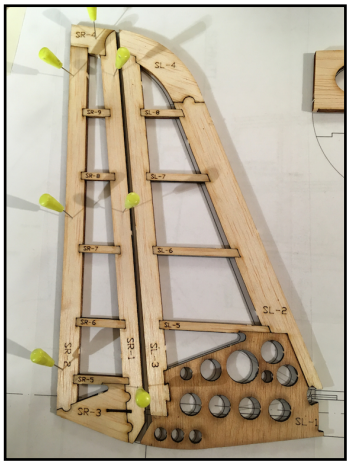
Vertical Stabiliser:

Remove the tail parts from the carrier board and pin the vertical stabiliser parts **SL1 - SL8** and rudder parts **SR1 - SR9** over the plan.

Make sure everything is flat on the building board before gluing with medium CA or PVA.

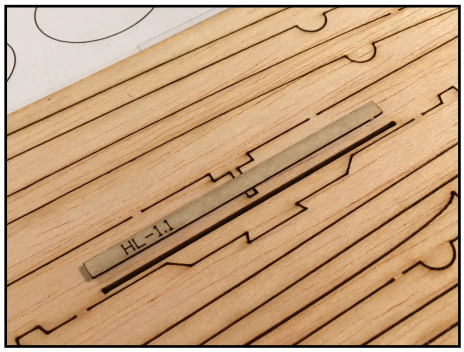
Once the adhesive has set, the components can be removed from the board and sanded to profile as shown on the plan.

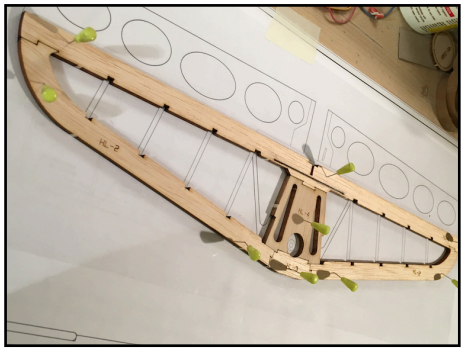




Horizontal Tail Plane:

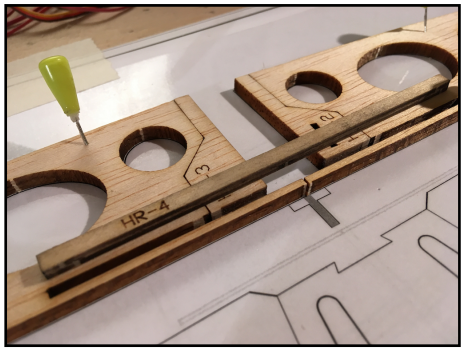
Glue the plywood reinforcement strip **HL1.1** into the prepared slot before cutting part **HL1** from the carrier sheet.





Assemble the horizontal stabiliser from parts **HL1 - HL9** and the elevator halves from parts **HR1 - HR 3** and pin them to the plan, and glue together with Medium CA or PVA.

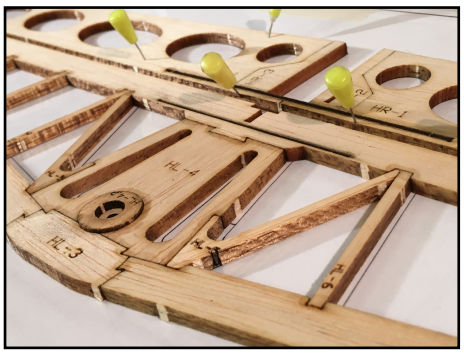
Laminate the elevator connecting strip from parts **2 x HR-4** with glue and then glue it into the slot in the elevator. Sand a 30° bevel on the bottom leading edge of the elevator and a taper on the trailing edge as shown on the plan.



Round off the leading edge of the horizontal stabiliser. Carry out the same procedure with the fin and rudder with the bevel on the rudder on the control horn (right) hand side!

Now the enclosed 1cm long (approx) piece of **2mm dia. Carbon rod** is glued into the recess in the trailing edge of the horizontal stabiliser. The end of the rod should be flush with the back edge of the stabiliser. Once the rod is glued in place, the rest of the recess can be filled with scrap Balsa and then sanded flush.

The horizontal stabiliser mounting bolt reinforcement ring is glued together from the parts **HL-4.1** and **HL-4.2** and then installed in the stabiliser with the recess for the mounting bolt at the top.



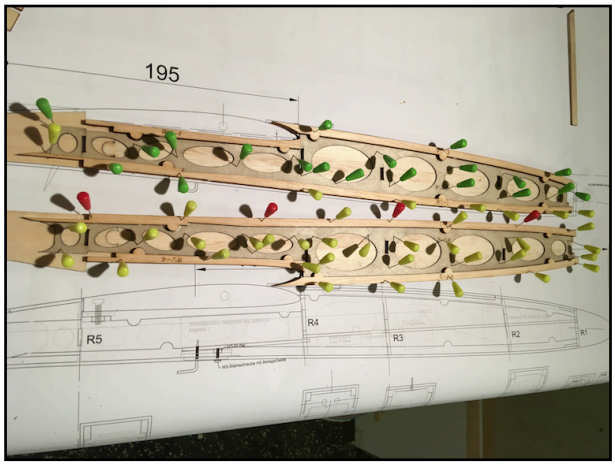
The horizontal and vertical stabilisers are later assembled for testing when the fuselage is ready and checked for a right-angle orientation. The fully covered vertical stabiliser is required to align the fuselage and then firmly glued into the fuselage during this stage.

Note: Don't forget to remove the covering film from the gluing area before gluing the fin in place!

Fuselage:

Important! If the fuselage is to be built for a **28mm** motor, please use the components with the suffix **-28** at the individual construction stages!

Note: **The construction stages of the E-version are marked in yellow!**



Pin the fuselage side walls together over the plan and glue with CA or PVA.

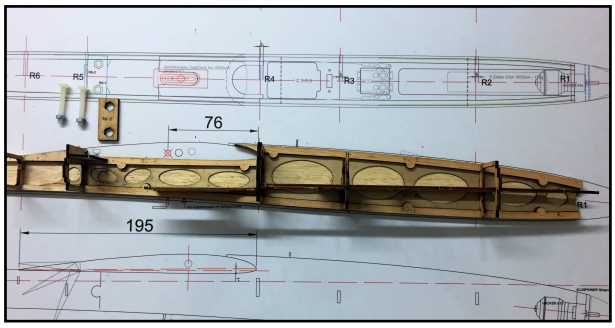
Glue the fuselage doubler parts **RV-1 - RV-4**, glues to the fuselage side walls with PVA. The easiest way to do this is to start with part **RV-1** along the bottom edge of the fuselage, then **RV-2** (here pay attention to the exact positioning of the slots for the fuselage formers!). Then glue **RV-3** and **RV-4**. These should finish flush with the upper edge of the fuselage.

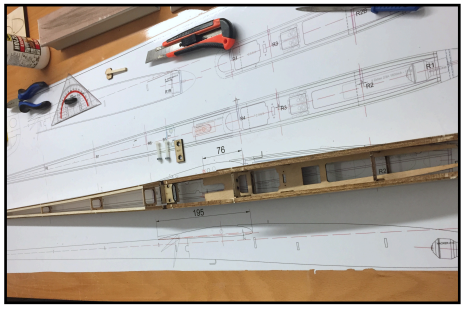
Note: **Make sure you create a right and left fuselage side!!**

Glue the **4x4mm Balsa** longerons in place along the top and bottom edges of the fuselage sides with PVA.
Glue the tapered parts **4 x R12** in position at the back of the fuselage. The end of the **4x4mm** lower longeron in the **R10** area is tapered slightly to match **R12**. See the plan..

Glue the two doublers **RV5** in position between fuselage formers **R5** and **R6** as shown on the plan.
Put the horizontal stabiliser mounting plate together with **R9, R10** and the guide support pad **RA11** together and secure it with CA. Pay attention to the orientation of the holes for the Bowden cables in former **R9** and **R10**!

Put the fuselage formers **R2 (R2-28)**, **R3** and **R4** together with the servo tray **SB-1 (SB1-28)** in position in a fuselage side wall and check for fit and alignment.
Now insert the remaining formers **R5, R6, R7** and **R8** into the fuselage side wall.
With Former **R5**, add the prepared wing bolt mounting plate (**R6-1 and R6-2**) and the Battery support tray **AB-1**.

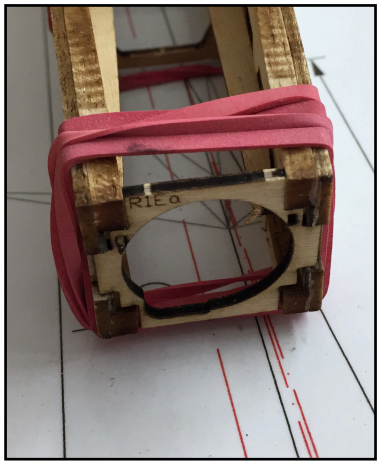




Now put the second fuselage side wall on the formers and make sure they are all fully located in their slots. Clamp them together but. **Don't glue anything together yet!!**

For alignment purposes, also push the vertical stabiliser into the slot in the rear fuselage and check everything over the plan for right angles and uniform bending of both fuselage side walls.

If everything fits to your satisfaction, secure the formers in position with CA. One method of doing this, is by running the glue into the former mounting slots on the outside of the fuselage.



Then glue the front bulkhead **R1** (glider version) or **R1E** for the E version, use Former **R1Ea!**

If a **28mm** motor is installed, then use **R1B-28**. If everything fits OK, the joints can now be glued neatly with CA or PVA.

If you are building the glider version. Before the fuselage floor is covered, glue the tow-hook reinforcement plate (**HST-1 with HST-2**) into the prepared opening in the fuselage floor with PVA.

In addition, behind the Former **R6** glue a transverse strip of left-over 4x4mm Balsa strip to create more adhesive surface for the fuselage top sheeting.

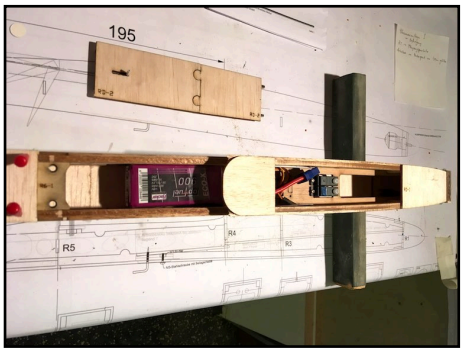
Tip: **In order not to have to perform finger acrobatics, if you are going to use an on/off switch it is advisable to screw it in position in the fuselage now! (Glider version only!).**

The doublers **RD1.1** and **RB1.1** (top and bottom) are glued flush between the fuselage sidewall doublers, so that more "meat" is available for the later shaping of the nose block.

Before gluing the fuselage floor in place, use a sanding block to go over the gluing surface to achieve a clean flat bonding surface on the lower edge of the fuselage sides.

Glue the bottom sheeting, starting from the tail and working forwards. The sheeting should finish flush with the fuselage sides. You may need to force the fuselage side walls apart slightly.

Glue the parts **RD-3** and **RD-3.1** together to form the wing leading edge fairing and also press the short piece of the Bowden pull tube off the provided latch assembly into the slot on the underside and secure it again with a piece of 0.8mm plywood and medium CA. Glue the dried assembly onto the fuselage, against the front of former **R4**.



Before gluing the fuselage top sheeting in place, thread the Bowden cable tubes through the fuselage formers, starting from the tail. If the formers **R9** and/or **R10** were installed incorrectly, you will see the problem it causes now!

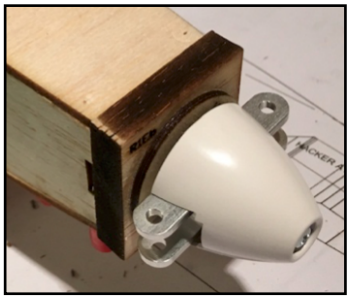
The radio hatch **RD-2** is now placed as a template on the fuselage and the top sheeting, in the direction of the fuselage nose, is completed.

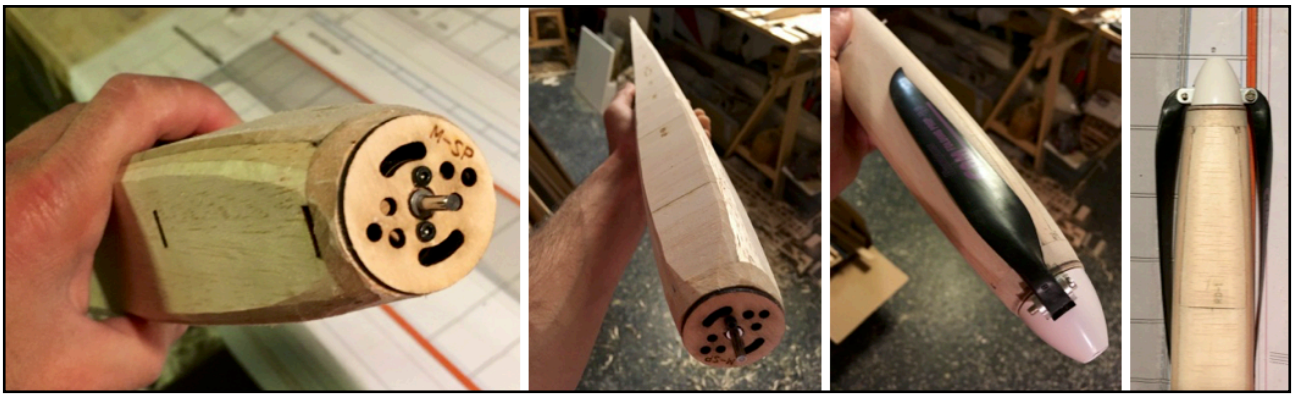
Do not stick the hatch cover to the fuselage! Also stick the fuselage top sheeting behind the wing mounting plate **R6-1** and **R6-2**.

After the adhesive has cured, sand the sheeting flush with former **R1/R1E** and glue the prepared fuselage nose to the fuselage. Secure it against slipping with masking tape.

Electric Fuselage Nose (Hacker drive):

Now glue the Balsa part **R1Eb** to the fuselage former **R1Ea**.
Screw the **M-SP** motor plate (GRP and wood together) to the motor making sure it is aligned centrally, with the motor wires lying in the intended recess, now glue with second glue to the Balsa former **R1Eb** and soak well with thin-liquid second glue, glue. Do not stick the motor!!





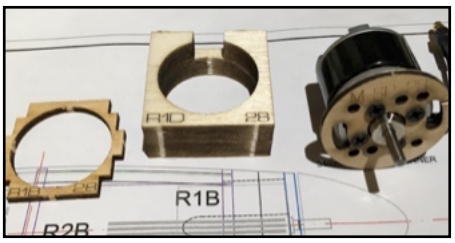
After the glue has set hard, the fuselage is ready for finishing and can be sanded to shape. Depending on the desired appearance and desired look, the edges can be rounded, as shown in the sectional drawings.

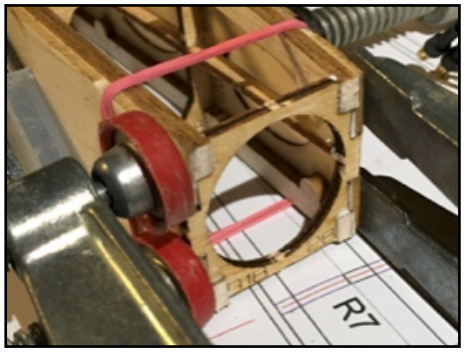
Transfer the outer contour of the spinner to the former. In the pictures a 30mm dia. Aeronaut spinner has been used.

28mm Fuselage Nose (Joker drive):

As mentioned earlier, use the components with the **-28** suffix.

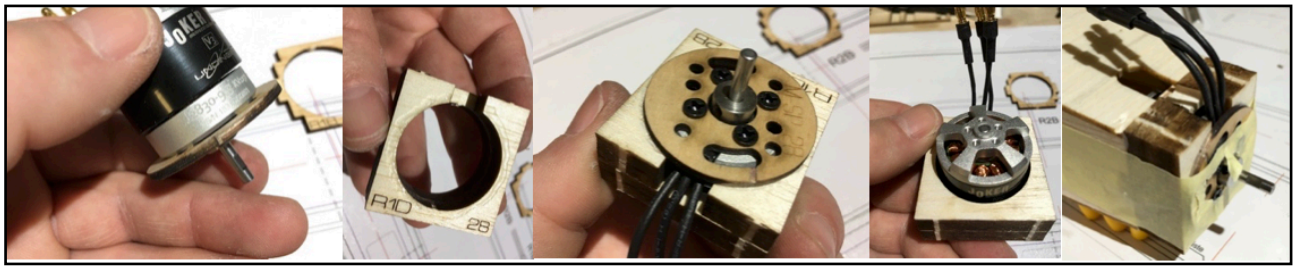
Glue the front bulkhead **R1B-28** in position as shown.



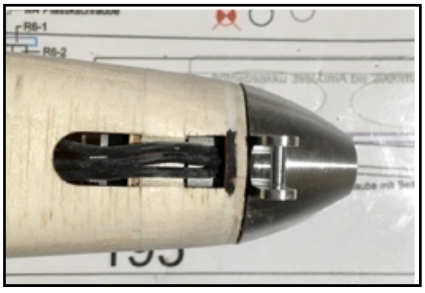


Glue the two Balsa rings **R1C-28** and **R1D-28** together.

Screw the motor mounting plate **M-SP-28** to the motor and slot it into the **R1C** & **R1D** combination. Glue the motor plate to **R1C** with thick CA. Ensure it is centred before you press it into place. The motor wires run outside the fuselage so as not to rub against the rotating motor housing later.
Glue the entire block with built-in motor and ESC connected (you won't have access later!) to the front of the Former **R1B-28**.

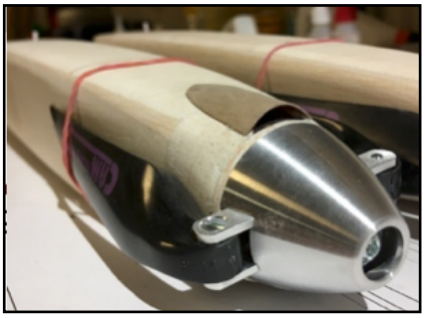


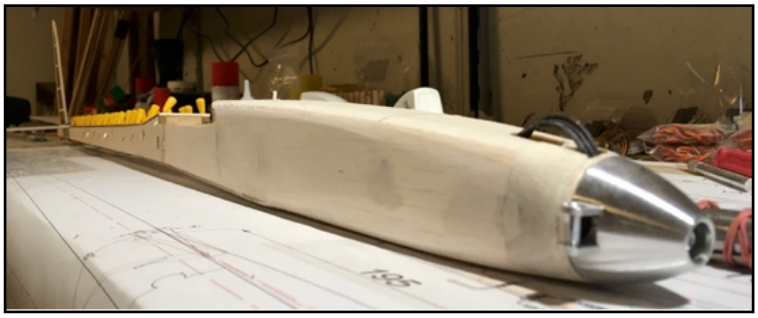
Glue the Balsa ring onto the motor plate.



Afterwards, slide the spinner onto the motor shaft and mark the outer diameter on to the former, so that you can now sand the nose block to match the spinner profile.

Using some scrap **0.4mm Ply**, you can make an air scoop to go over the motor cable slot. Alternatively you can make a flush cover if you prefer.

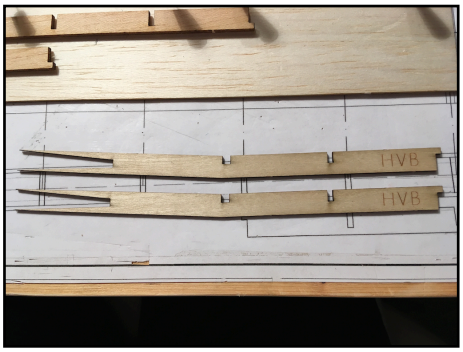




Wing:

Each wing consists of three panels. The first dihedral step is reinforced with 2 x 1.5mm aircraft ply joiners.

Construction begins with the innermost panel, where the wing seat and wing mounting bolt plate is also housed.

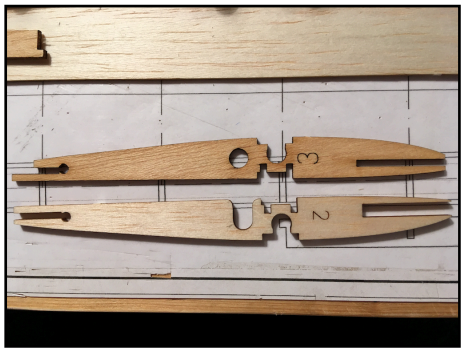


Inner Wing Panel (with Landing Flap):

Tip: First, protect the plan with the self-adhesive film where the wing components are going to be pinned down.

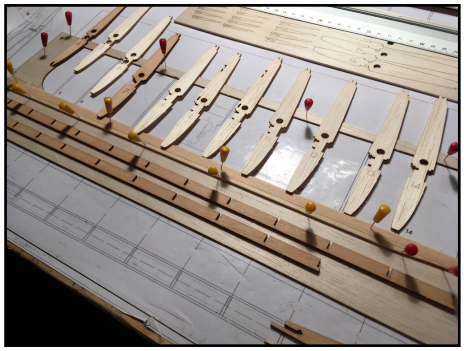
Afterwards, build the main spar over the plan by gluing together the **2x8mm Pine** spar cap and the **2x3mm Pine** strip reinforcement and cut to the exact length (compare with the lower planking).

Glue the root ribs **2** and **3** together with white glue. Make sure you build a left and right version! **Rib 2 is the outer or root rib!**

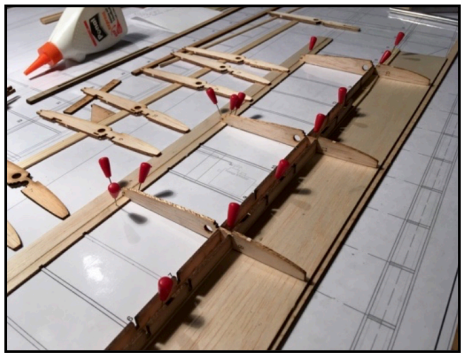


Remove the **1.5mm Balsa** wing underside panels from the carrier sheets and pin them on the plan and glue them together.

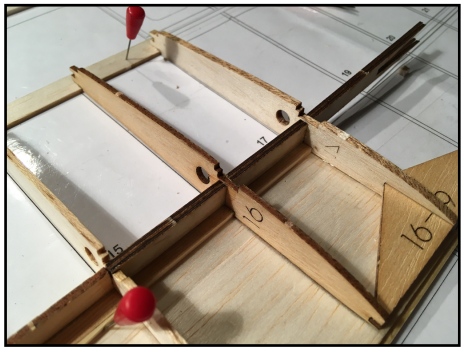
A **2mm Balsa** strip is placed under the leading edge of the panel to raise it sufficiently to touch the bottom edge of the ribs when they are positioned.



Release ribs **2-17** from their carrier sheets and using them as templates to ensure it is positioned correctly, glue the lower spar cap assembly in position on the underside panel sheeting. Make sure everything is secured flat against your building board!

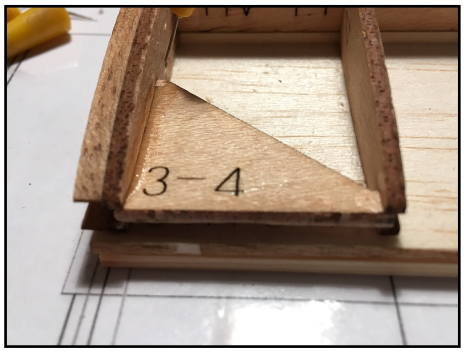


The Ribs **8, 11**, and **15** are now carefully slotted in place on the front and rear webbing strips and trailing edges and glued in place.



The wing joiner strip **HVB,** is integrated with the inner panel before fitting rib **16** and **17**. The remaining ribs are then added. The easiest way is to slot all the ribs in position and then glue them in place. The root block (ribs **2** and **3**) and end rib **17** get their dihedral angles from the slots in the webbing strips. However, double check with the enclosed angle templates.

Glue the two main spar webs **HV-1.2** and **HV-1.3** in place between ribs **13** and **15**.



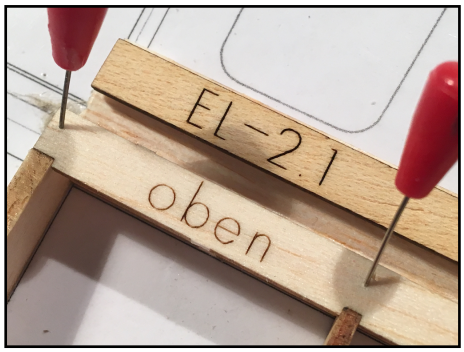
The reinforcement gussets **3-4** and **16-19** are glued to the false leading edge. **3-4** fits halfway through rib **3**!

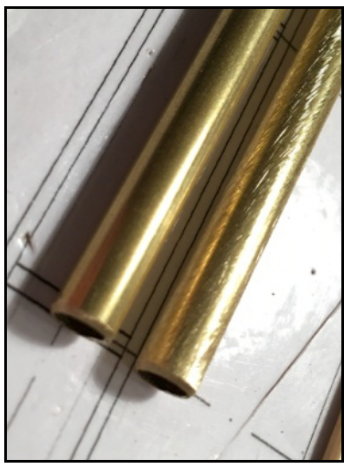
Now the wing mounting bolt reinforcement plate **V-SCHR** is inserted from behind into the prepared slots in ribs **2-5** at the wing root. See the plan.

The **2x3mm Pine** reinforcing strip is threaded into the slot in the back of the ribs **4-17** and glued in place.

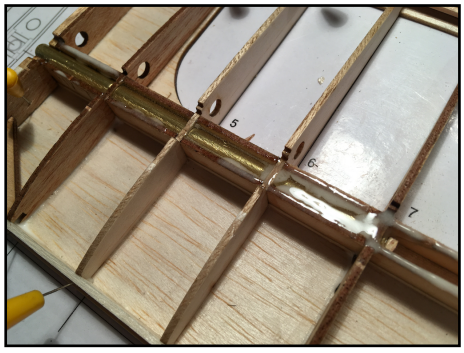
The trailing edge **EL-1** at the root of the surface is pushed onto the **2x3mm Pine** bar so that **EL-1** is flush with the Pine bar.

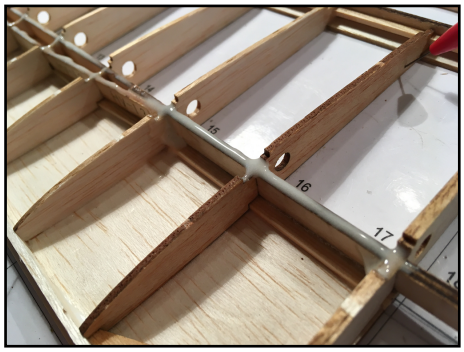
The trailing edge is completed by the **Poplar ply** strip **EL-2.1**. This is glued to the lower sheeting, the ribs and the top sheeting (oben) as shown in the picture.



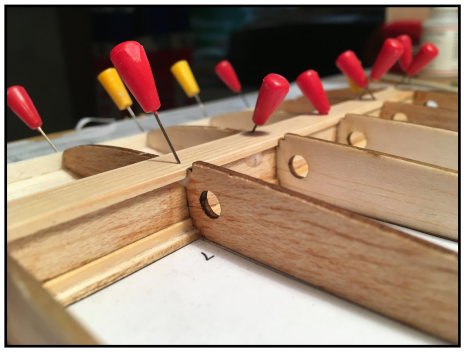


Roughen up the Brass wing-joiner tubes and slide them into the precut holes in the ribs. Tack them in place with medium CA before filling the void around the tubes and between the front and rear spar webs with Epoxy Resin as shown.





The excess resin, can now be used to glue the top spar into the rib recesses.



Glue the **3mm Carbon incidence pin** into the wing root as shown on the plan.

Now stick the false leading edge **HL1** in front of the ribs and on the lower sheeting. Once the glue has set, sand the top of the false leading edge flush with the tops of the ribs.

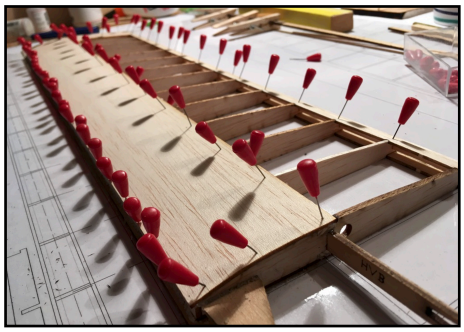
Now the Balsa top sheeting is glued in place.

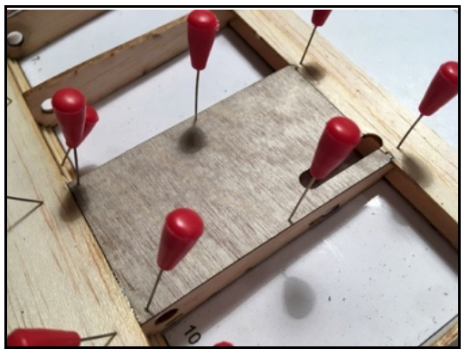
I recommend the 'Hot Iron Method'. If you are familiar with this technique, you can skip this bit!

Add Tite Bond or other Aliphatic Resin to all the gluing surfaces and then place and pin the top sheeting in position. Using a hot covering iron (200ºC), iron over the sheeting, making sure the Balsa sheeting gets good and hot!

Alternatively, once you have placed the sheeting on the wet glue, remove it again! Smear the glue evenly where it has touched on all the joining surfaces with your finger and then leave it to dry.

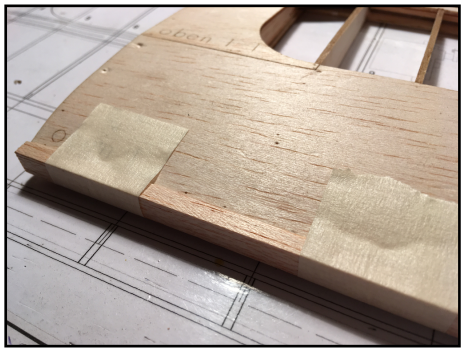
Once the glue is dry both joining surfaces, you can position the sheeting and hold it in position with a few pins and then hit it with that hot iron. The resin will cure instantly!

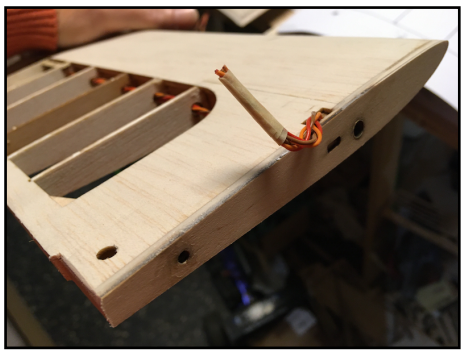




Likewise, the **0.4mm Ply** covering of the flap servo box is now also glued in place.

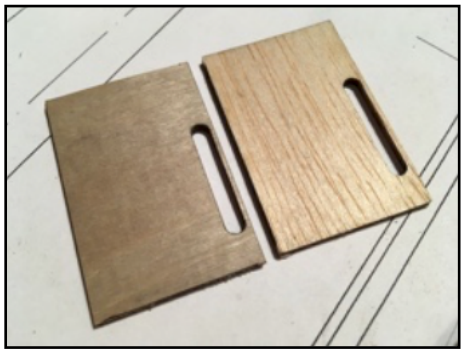
The **5x8mm Balsa** leading edge, is glued in place after the leading edges of the upper and lower sheeting have been sanded flush with the false leading edge. Use masking tape to hold it in place until set.





The **1.5mm Ply** end Rib **1** is glued in place only after the servo cables have been pulled through.
Servo cables of the required length are included in the kit.

It is best to press both wing halves against each other so that the end ribs are glued to the inner panels free of gaps, (secure with masking tape).



Glue the Flap servo box cover made of **0.4mm Ply** (inside) and **1.5mm Balsa** (outside) together .

The completed panel can now be removed from the building board.

At the bottom, the holding screw reinforcement bars for the servo box hatch cover are now inserted into the slots pre-cut in ribs **9** and **10.** Using the hatch cover as a template, make a frame from scrap **2mm Balsa** for the hatch as shown for attaching the covering film to.

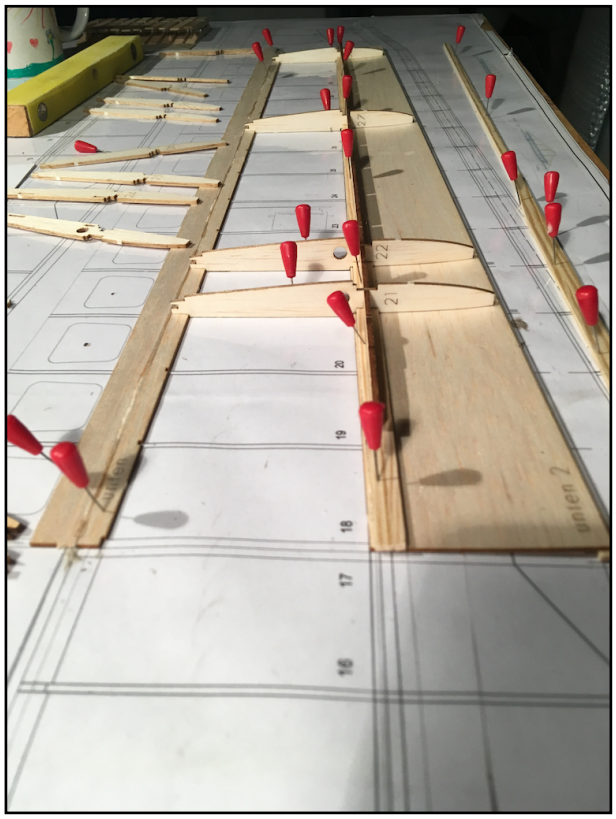
The inner wing panel is now complete and ready for sanding. Check the leading edge frequently with the enclosed template **2-17**. To ensure the correct profile

Middle Panel:

Some of the steps are now repeated because construction follows the same principles as on the inner wing panel.

Tip: **The aileron is constructed separately from the wing panel!**

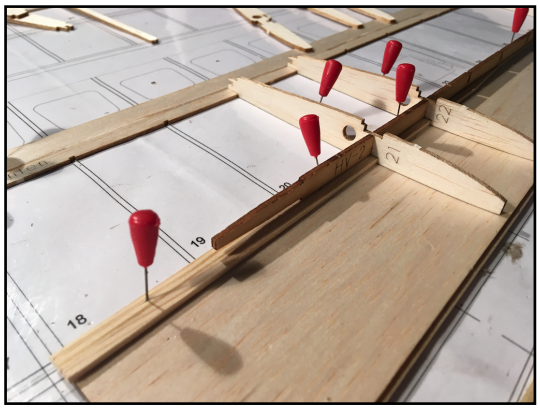
Remove the required ribs **18** to **33** from the carrier sheet and place them on.
Prepare the upper and lower spar caps by gluing together the **2x5mm** and **2x3mm Pine** strip as shown on the plan and cut it to the correct length. (Check this against the bottom sheeting).

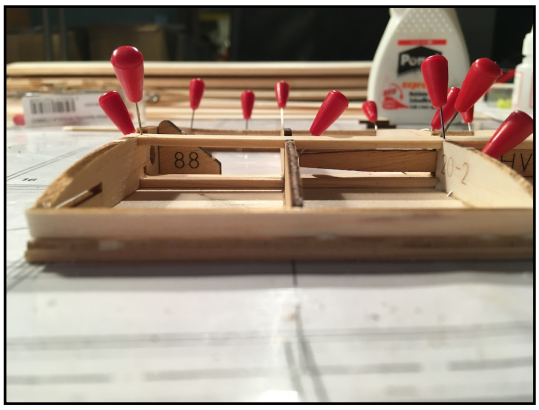


Remove the **1.5mm Balsa** bottom panels from their carrier sheets, pin them over the plan and glue together. Slide a **2mm Balsa** strip (**HL1**) under the leading edge to raise the planking as before.

Again, use some of the ribs as templates (do not glue them) to ensure the lower spar is positioned correctly before you glue it to the bottom sheeting.

Carefully slot the ribs **21, 22, 27** and **32** on the spar webbing comb **HV-2,** then position the whole assembly on the bottom spar cap.

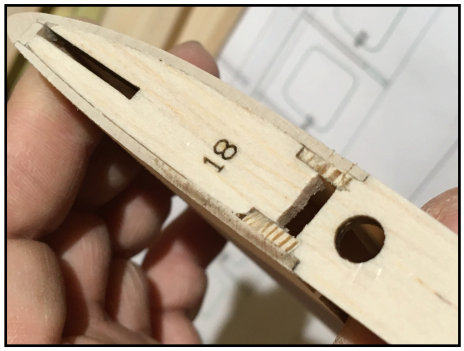




Note: Take care when positioning web HV-2 on the spar cap, because the spar joiner HVB protrudes two rib fields into the middle panel – up to rib 20!

The remaining ribs are then glued in position.

The middle panel root rib **18**, is aligned with the help of the dihedral template and glued to the spar cap as well as the bottom sheeting. Only after the top spar cap and sheeting has been glued in position and everything has set hard, can the rib be slotted as shown so the spar joiner **HVB** can be slid in place. The existing notch shows the position of the separation.



Next comes the **2x3mm Pine** trailing edge reinforcement spar, which is inserted into the recesses at the back of the ribs and glued.

The upper spar cap (previously prepared from **2x8mm** and **2x3mm Pine** strip) is now aligned and glued in place.

At the front of the panel, the false leading edge, **HL2** is now glued to the ribs and the bottom sheeting.

After the adhesive has cured, again, sand the top edge to profile with the top of the ribs before gluing the top sheeting in place.

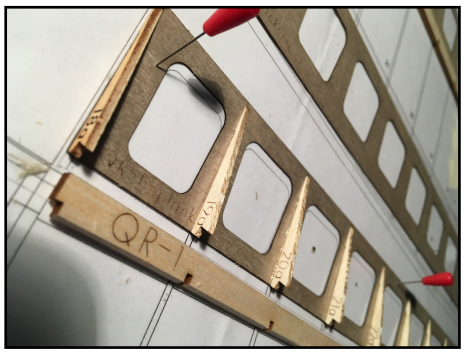
Finally, sand the leading edges of the top and bottom sheeting flush with the false leading edge before gluing the **5x8mm Balsa** leading edge in place.

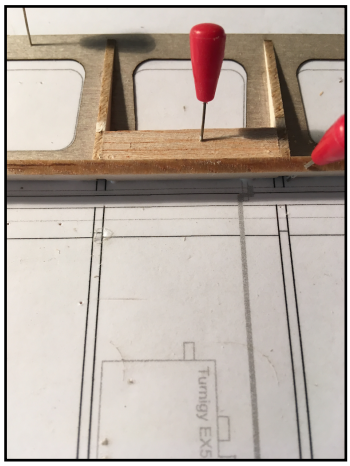
Tip: The wing panels are glued together in reverse order. I.e. first the wingtip section is butt glued to the middle panel with either PVA or Epoxy and only then to the inner panel with Epoxy.

Aileron Construction:

The **0.4mm Ply** bottom panel is pinned down to the plan.

Then the ribs **18a to 33a** are glued in position, ensuring they are perpendicular to the building board.





The **3mm Balsa** leading edge (**QR-1**) is then pinned on the ribs and bottom sheeting before being glued in place.

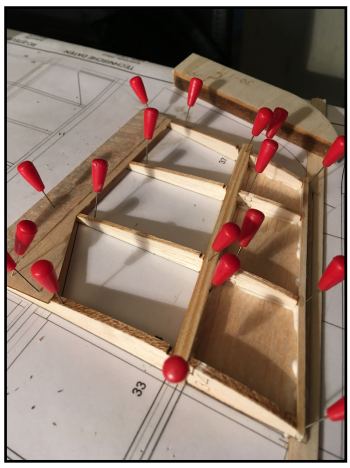
In the bay between ribs **23a** and **24a**, where the aileron horn is sited, double the leading edge **QR—1** with scrap **3mm Balsa**.

QR-1 is sanded flush with the top of the ribs before the upper **0.4mm Ply** sheet is glued in place.

Finally, an **0.8mm Ply** doubler **QR-2** is glued on to form the leading edge of the aileron.

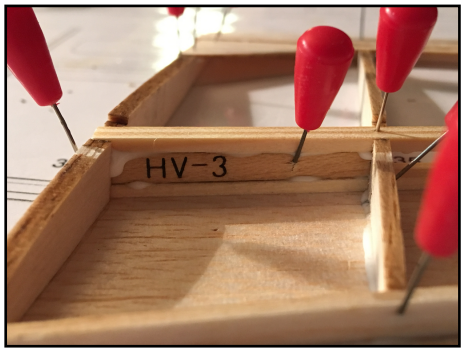
Wingtip Construction:

The construction procedure is exactly the same as the other wing panels. Pin the **1mm Balsa** bottom sheet to the plan and use the ribs to ascertain the correct position for the **2x5mm Pine** lower spar cap before gluing it in place.



Glue ribs **34** to **37** in position over the lower spar cap and bottom sheet. The dihedral angle of rib **34** is set by the spar web **HV-3**, in the first rib bay.

Double check with the supplied template **82.** Then add the **2x5mm Pine** top spar cap.

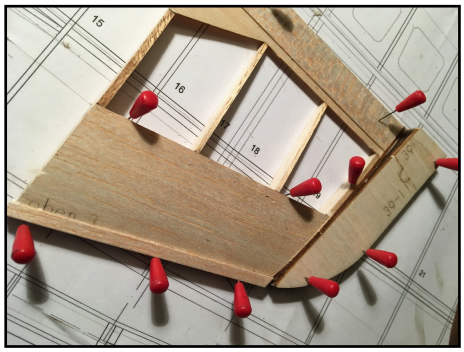


Pin and glue the **4x20mm Balsa** trailing edge in position against the back of the ribs.

Then glue the false leading edge **HL2** in position. Again, once all is set, sand the top edge flush with the rib profile.

Next, glue the **1mm Balsa** trailing edge top sheet and leading edge sheet in position.

Sand the top and bottom sheeting flush with the false leading edge **HL2** before gluing the **5x8mm Balsa** leading edge in position.



When everything has cured, cut any excess capping strip or sheeting flush with ribs **34** and **37** before gluing the end rib **38** in position.

Finally, the tip block parts **39-1** and **39-1.1** are first glued together and then glued flush with the bottom edge of rib **38**.

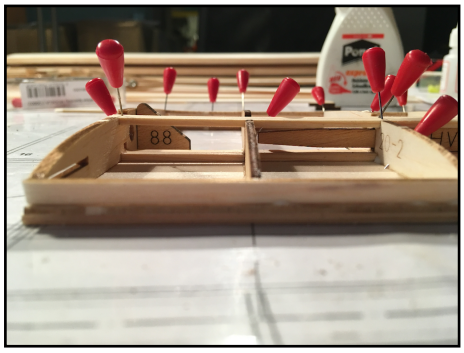
The wing panel construction is now complete and ready for sanding to profile. Take great care when sanding the leading edge to shape using the supplied profile templates.

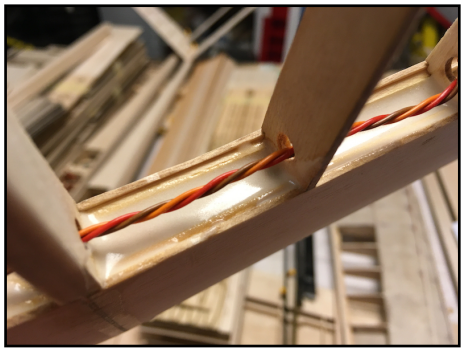
The correct shaping of the leading edge has a significant impact on the flight performance characteristics of the model!

As previously mentioned, the wing panels are glued together from the outside to the inside. I.e. Wingtip onto Middle panel using PVA or Epoxy. Then middle panel onto the inner panel using 30 minute Epoxy.

Tip: If you have the space, I recommend doing both wings together at the same time to ensure that the dihedral angles are the same on both wings.

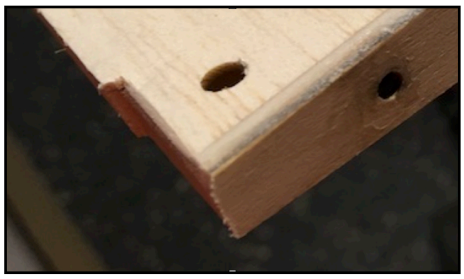
Slide the middle and inner wing panels into each other and check the fit accuracy. It may be necessary to adjust the spar joiner to get a good fit. The panels should plug together without the need for force.





Once you have achieved a good fit between the inner panel joiner **HVB** and the middle panel web **HV-2** and a clean transition between the two panels, glue, pin, and clamp the two end ribs **17** and **18** together with Epoxy and fill the gap between the upper and lower spar caps between ribs **18**, **19** and **20** with Epoxy as shown in the picture.

Use any leftover Epoxy to fill any gaps in the the upper and lower Balsa sheeting and remove any excess with kitchen tissue dampened with acetone.



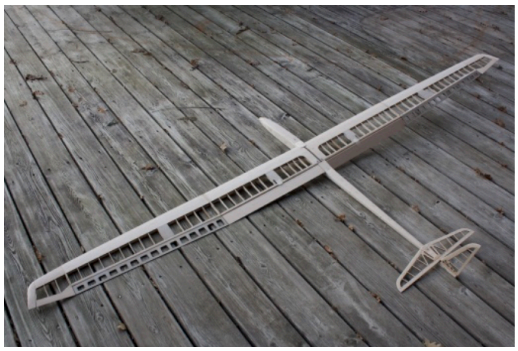
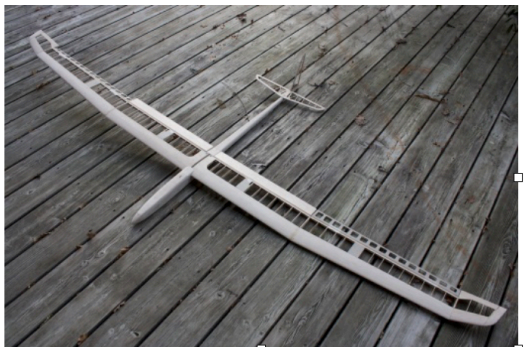
Sand an oblique angle to the trailing edge (see picture) where it sits on the wing mounting plate **R6-1**, so that the wing panel slots easily in place on the fuselage. See the plan for detail.

Drill 4mm holes in the leading edge of the inner panel so that the 4mm Carbon locating dowels slide into the slots cut in ribs **2** and **3**. Check the plan for the correct position. Then glue the dowels in place with Epoxy or medium CA.

Tip: **Build the other wing half as a mirror image.**

Completion:

Assemble the completed airframe and check the fit and alignment.


Note: **If there are any issues, now is the time to put them right!**

Covering:

The surfaces and the fuselage can now be covered. Oracover is generally recommended for this. Oralight can be used for the wing and tail surfaces (because of the weight advantage) and Oracover for the fuselage.

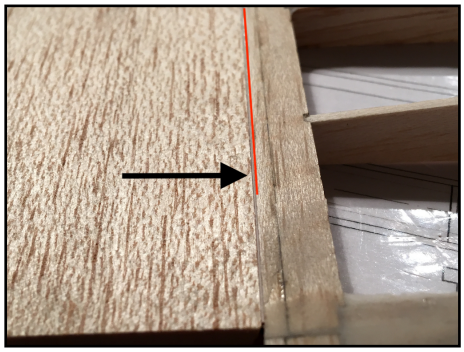
It is also possible to cover only the open rib bays and to treat the remaining wood surfaces with at least three coats of **Sanding Sealer**, using 400 grit sandpaper between coats.

Covering Film Hinges:

There are advantages to hinging the control surfaces with the covering film method. It saves weight and creates a strong gapless hinge for the entire length of the control surface. The following pictures show how to do this using the example of a wing flap.

In this case, using a credit card, or similar (I use a metal rule) as a spacer, the flap is laid upside down on the underside of the wing flush with trailing edge.

Then a strip of covering film is ironed along the exposed leading edge of the flap and the trailing edge of the wing.



After that, the flap is swung back into the neutral position. Revealing a fine gap where the film is just visible.

Now, either a strip of film is ironed along the top of the gap, or the whole surface to form the top of the hinge.

Fuselage Servos:

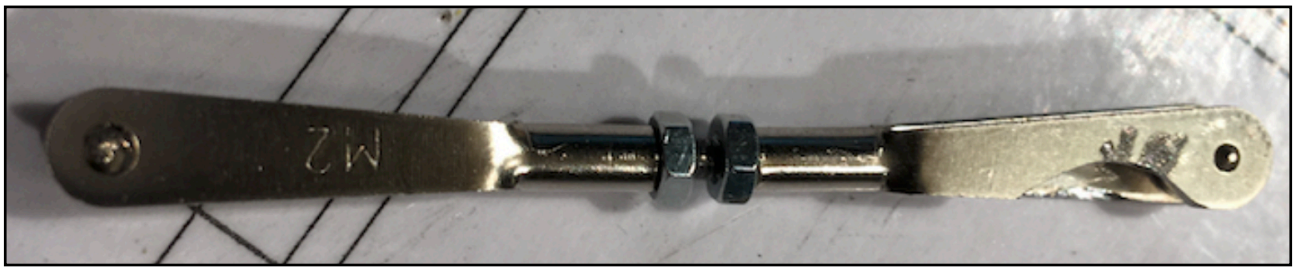
The fuselage servos, 2 x 9mm servos, e.g. HS45, are now installed in the fuselage.

The receiver battery – a 4 cell battery with 2/3A cells – is placed in the fuselage nose and then the receiver with the on/off switch.

No or little additional trim lead should be required to reach the centre of gravity!

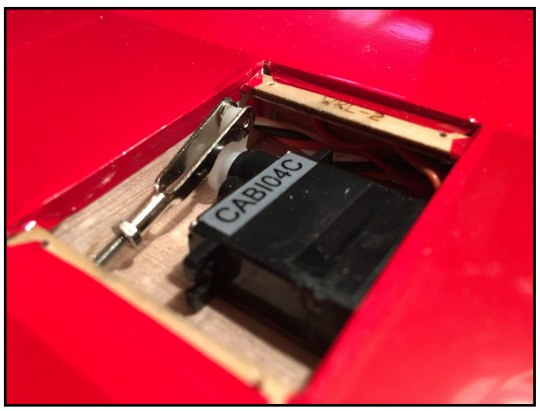
Then the push rods are inserted. On the servo end of the steel wire inner a sleeve is soldered in place and a clevis or ball head is screwed on. Repeat the procedure at the control horn end and adjust for rudder and elevator neutral.

The Graupner DES428/DES427 (or similar) servo is installed in the wing for the flap and for the aileron. The enclosed clevises on the threaded rod are used for aileron linkages. The slightly longer ones are used for the flaps.

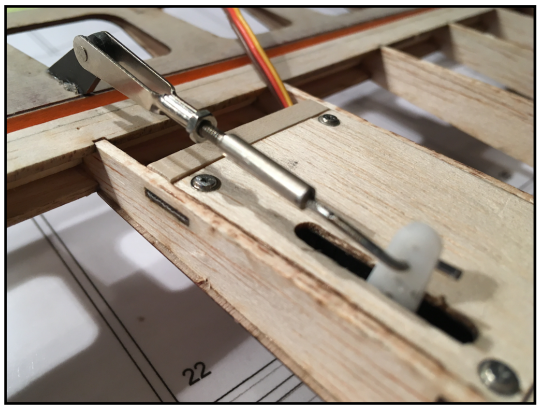


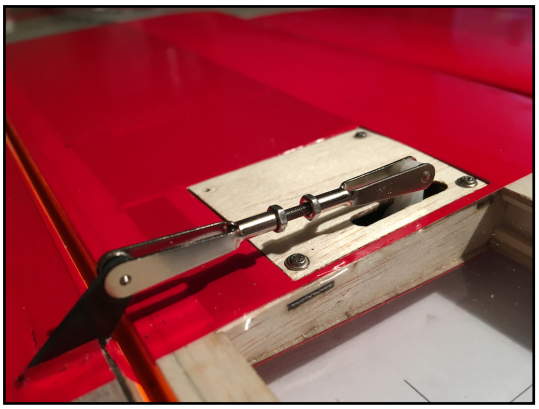
The clevis on the servo side must be filed out a little so that it does not bind on the servo arm and impede servo travel.

Flap Servos Installation:



Aileron Servo Installation:





The model is now ready to fly.

A flight weight of approx. 700-750g should be achieved in the soarer version.

The E-version is about 100g heavier - i.e. approx. 800-850g

E-version:

Assemble and install the motor, regulator, spinner and corresponding prop. As a drive battery you should use a 3s1000mA large battery.

This allows you to adjust the centre of gravity without additional trim lead. The battery should be retained under the wing under the wing in a non-slip manner. I.e. Velcro.

In the prototype, we used a **HACKER A10-7L** motor with gearbox and a 13”x7” folding propeller.

This drive configuration, with a 3s 1000mA battery, helps the model to at least 5 climbs to a height of about 150m. The climbing angle is approx. 50° and the motor run-time per climb is approx. 30-45 seconds.

Control Surface Deflections

+ Up, -Down	Measured at trailing Edge
Elevator	+15mm / -10mm
Rudder	Left/Right 25mm
Aileron	+15mm / -8mm. Butterfly +20mm. Thermals -1mm
Flaps	Speed +3mm. Butterfly -45mm. Thermals -4mm

It is also very important that the servo end points are set, such that they do not “buzz" or “chatter”. Or they will be overloaded and consume considerably more current than necessary. Be especially wary with the flap servos, at both ends of their travel.

Note: Worst case scenario, premature power loss and loss of control!

Centre of Gravity (CofG):

As illustrated on the plan, set a CofG of **76mm** behind the leading edge for the first flights,.

During flight testing, the CofG can safely be moved back by up to **4mm**. Be aware that as the CoG moves aft, the model will become more pitch sensitive and unstable and require full-time ‘hands on’ flying to keep the model under control.

On the other hand, moving the CoG forwards will increase the models stability to the point where the model will fly comfortably ‘hands off’. Too far forward and control becomes sluggish and unresponsive.
If the CoG is set correctly with elevator trim at neutral, when the model is placed into a **45**° dive and flown “Hands Off” it should recover gently back to level flight unaided.

If the model is nose heavy (i.e. rearward CoG) it will zoom climb upwards and stall if unchecked. If the dive steepens, the model is tail heavy.

Tip: There is an old saying amongst old modellers worth remembering:

Nose heavy models fly badly,
Tail Heavy models fly once!

Maiden Flight:

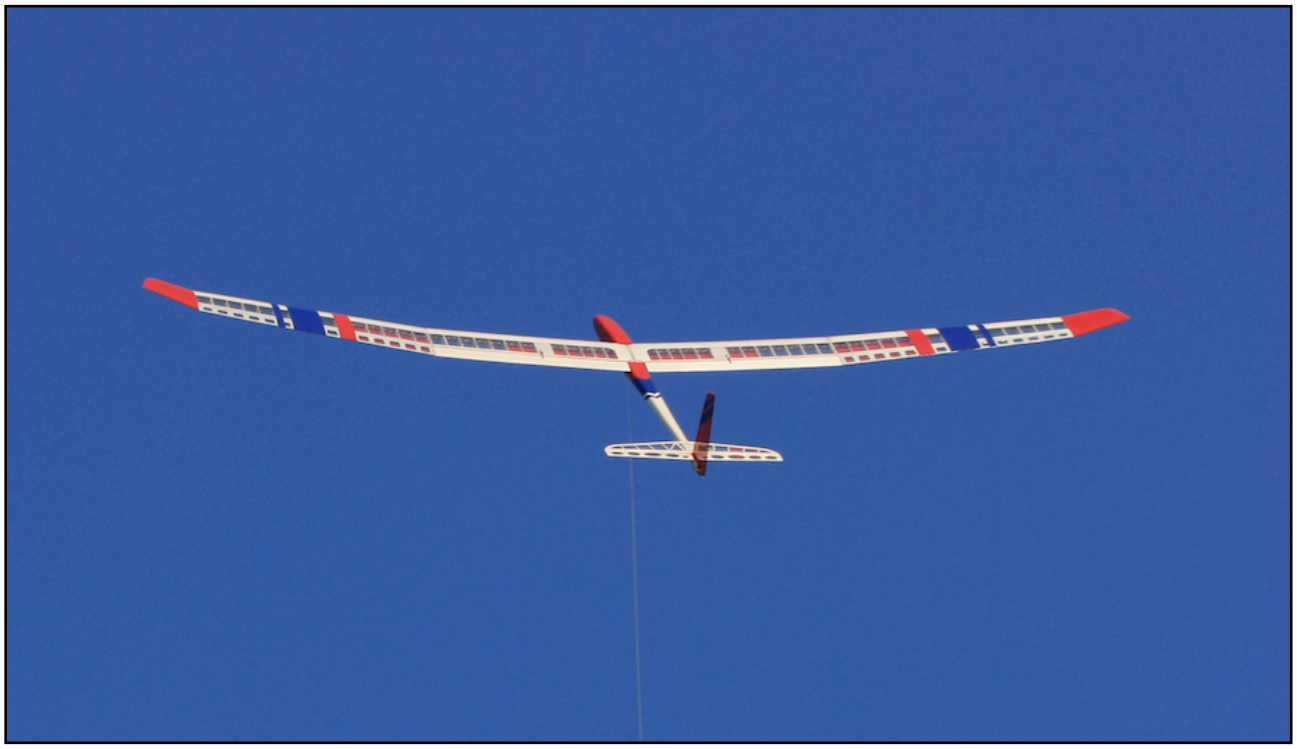
Now, onto that first hand launch.

With the wings held level, launch with a firm shove horizontally into the wind. It should perform a reasonably even, smooth glide. If not, make any necessary trim adjustments only after landing.

Continue launching the model by hand, making any adjustments to trim or CofG necessary until smooth flights in excess of 100metres or large circuits are being achieved with little or no intervention.

Once you are happy with the trim, it’s time to try the Hi-Start. For the first launches, do not stretch the rubber too much and screw the tow hook into the rearmost hole. After several launches and by adjusting the tow hook position if necessary, the model should launch straight up the line and come off the hook with minimal intervention from the pilot.

If the model climbs too steeply and comes off the hook prematurely, move the tow hook forward to the next hole.



If the climb is too shallow and fast, then move the tow hook hook into the next hole back.

Note: Use the rudder if you need to control direction during launch!! Ailerons will only cause an undesirable rolling motion.

For more height, the wing flaps can now be lowered into the “Thermal” position (2-3° down).

If your radio supports Flight Modes, setting up “Thermal” and “Speed” modes is recommended as a minimum. “Launch” and “Landing” modes are extremely useful as well. The choice is entirely up to the pilot.

Flaps in “Thermal” mode (2-3° down) or “Speed” mode (2-3° up) shouldn’t need any flap/elevator mixing. With 3-4mm of down flap deployed, tight thermal turns can be comfortably achieved without the need for more “Up” elevator.

I also recommend testing the effect of the butterfly position (“Landing” mode) with some height in hand, so as not to experience any unpleasant surprises near the ground.

When flaps are fully deployed, a down elevator mix will be necessary. However, the exact value can only be decided after test flying.

Tip: As a starting point, for light wind conditions. Set your elevator/flap mix at 85%.

Similarly, coordinated rudder and aileron or rudder/aileron coupling is necessary to avoid side-slipping in thermal turns.

We wish you every success and pleasure flying with FXj 2.5