

KIWI

competition RES - 2m wooden glider



Wingspan: 1997 mm
Length: 1180 mm
Total surface: 41,5 dm²
Profile: Mark Drella RES AG serie
Flying weight: from 380 g
Wing loading: from 9,15g/dm²

The Kiwi is high-performance model for competition in RES 2m Class. Full wood construction, without carbon and other „cosmic“ technology. Easy and quick building, made from ecological material, but beautiful on air! Very good and easy circling and handling, high starting heights. Used two spoilers for reduction of turbulence on tail surfaces - retaining good reaction on elevator for precise landings. Kiwi have short nose for reduction inertia, big wingarea and low wing loading for great performance in the light thermal condition. Fuse is sharpened for precise landing to point. Kiwi is small F3J baby !

Basic settings

CG position	78 - 85mm
tow hook position	75-83mm
rudder	20/20
elevator	15/10
spoiler	max. 80st + elevator mix with 5-7 point curve

enjoy your KIWI !
Tomas Hlavinka & HPmodel

Building Instructions

Our recommendation for glueing are dispersion (white) adhesives for most parts of model. You can also use thick CA glue for parts without need of surface sanding and epoxy for some high strength joints. Important point is filling gap between joiner tube and spars - best to use epoxy with microballoons.

For wooden model it is really important to glue parts well!

When you glue parts to lasered ("black") side, is good idea to gently sharpen this side with fine sandpaper. Be careful while using CA glue!

Examples of best practices for glue selection:

plywood fuselage frame	thin CA glue
fuselage balsa outer frame	white glue / UHU Hart
ribs to trailing edge	aliphatic resin wood glue (Titebond Original)
ribs to spars	white glue / UHU Hart / CA
Spar uprights	white glue / CA
Balsa parts of wing cover	white glue / thin CA
Tail parts	aliphatic resin wood glue (Titebond Original) / UHU Hart
wing panels and joiners	epoxy
aluminum tube for joiner	epoxy

What else is needed?

Equipment:

Fuselage servos:	2x Hitec HS 65, Emax 08, Corona 843 MG, (8-10g servo)
Wing servos:	2x Emax ES 9051 / Turnigy MX-95E
Battery:	1S round cell LiPol 1000mAh/ 1S Lilon 18500
Covering film:	about 2 m Oralight/Oracover

Tools:

Flat building board
pins
Knife
small handsaw
sanding blocks
cannula for superglue
Flat Iron
Solder
Aluminium ruler
superglue – CA
5 Minute epoxy
yellow glue (aliphatic resin)

KIWI Building set

Small plastic bag

servo frame Emax 9051	2pcs.
tow hook M3	1pcs.
neodym 3x3	6pcs.
neodym 10x3	4pcs.
GlassFibre Rod 3mm	1pcs.
spring 0,5x70	1pcs.
Dynema 1,5m	1pcs.
Brass conector M2	1pcs.
GlassFibre horn	2pcs.
sticker KIWI	1pcs.

Medium plastic bag

steel ballast 10x50	4pcs.
hard wood ballast 10x50	4pcs.
steel joiner 5x238	1pcs.
aluminium housing 6x103	2pcs.

Big plastic bag

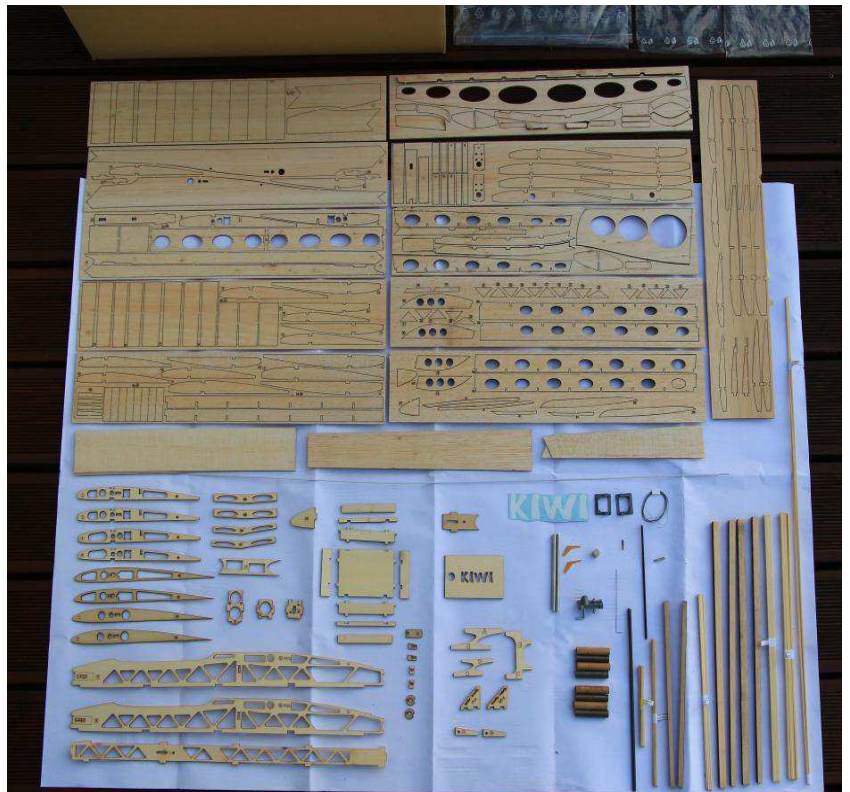
small plywood parts 3+1,5	42pcs.
leading edge Balsa 7	6pcs.
spruce 6x3-350	4pcs.
spruce 5x3-350	4pcs.
spruce 4x2-255	4pcs.
spruce 2x2-180 - spoiler	4pcs.
smrk 2x2-110 - balast box	8pcs.

In box free

plywood parts for fuse	3pcs.
bowden 1,5x1000	1pcs.
building plan	1pcs.
building manual A4	1pcs.

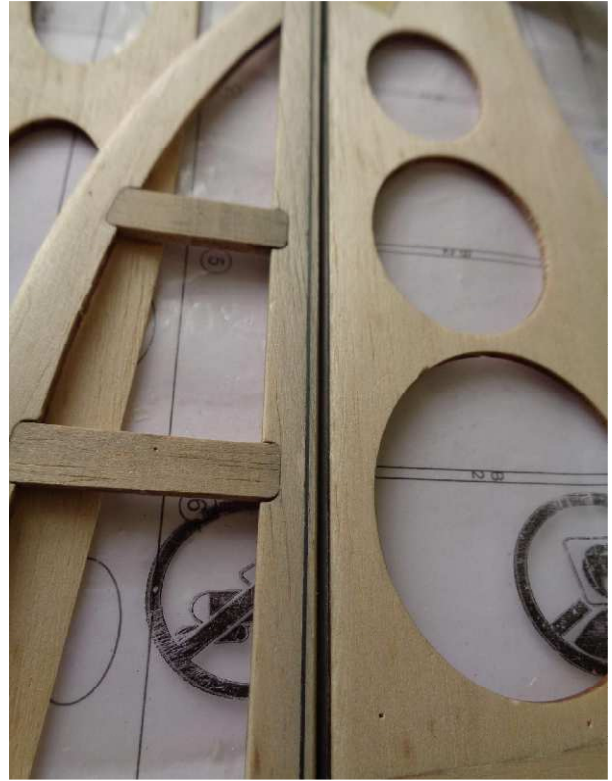
Balsa boards

Nr. 1	B2	1pcs.
Nr. 2	B2	1pcs.
Nr. 3	B2	1pcs.
Nr. 4	B2	1pcs.
Nr. 5	B2	1pcs.
Nr. 6	B2	1pcs.
Nr. 7	B3	1pcs.
Nr. 8	B4	1pcs.
Nr. 9	B4	1pcs.
Nr.10	B5	1pcs.
Nr.11	B5	1pcs.
Balsa 1mm for D-box	2ks	6pcs.



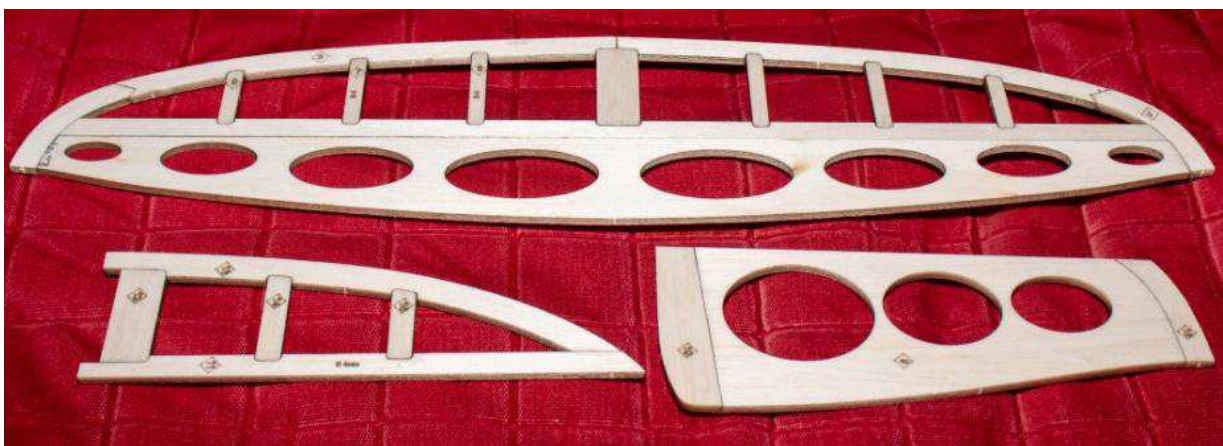
Tailplane

On plan protected with thin plastic foil complete rudder and elevator frames. Best practice is using special pins for model hobby (big head). Our glue recommendation is aliphatic resin (Titebond) for best sanding.



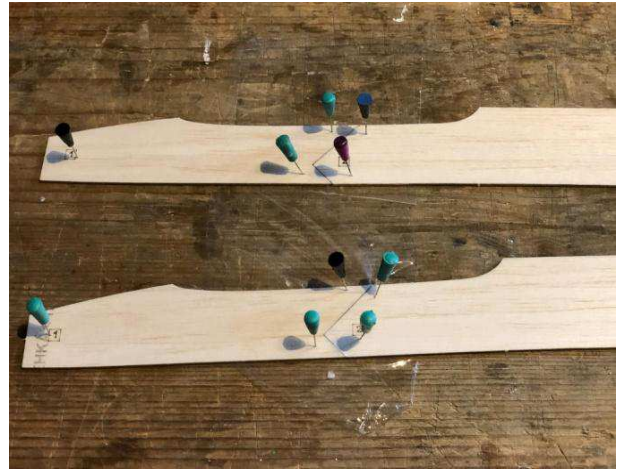
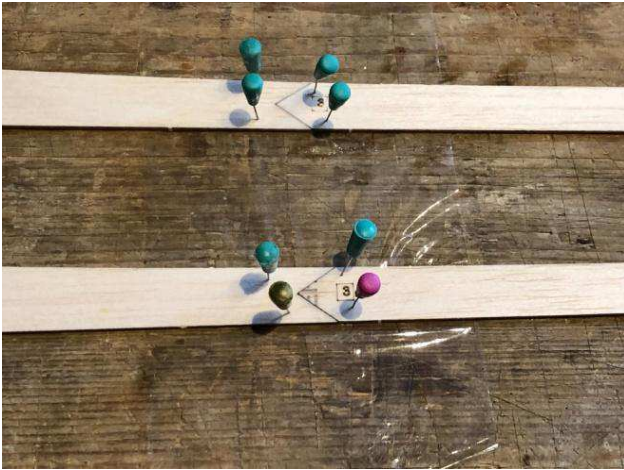
Is possible to improve strenght of tail parts, if you glue carbon spare 0,2-0,5x3-4mm to fix part of elevator/rudder. Weight is small, but rigidity of part goes up.

As last step you have to sand parts to final shape - see plan – round leading edge, movable parts to wedge. Also sand edges at point of rotation, see plan. Now you are ready to covering.

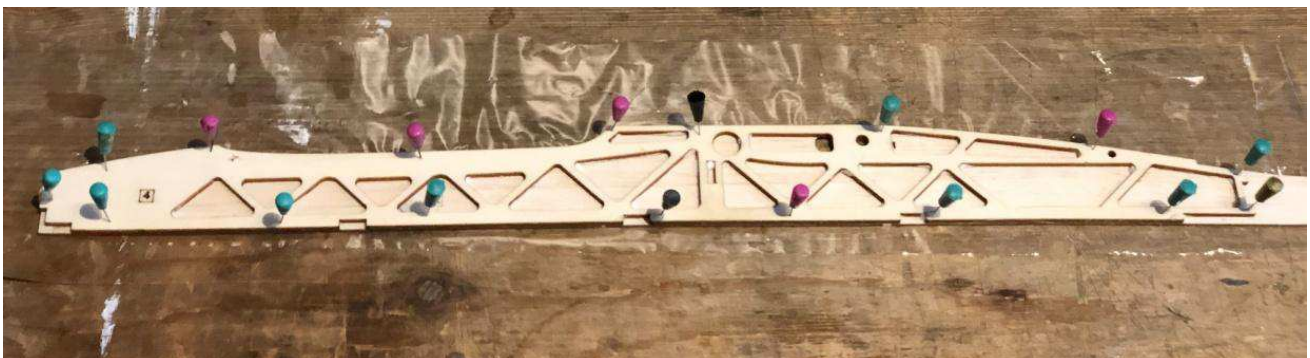


Fuse

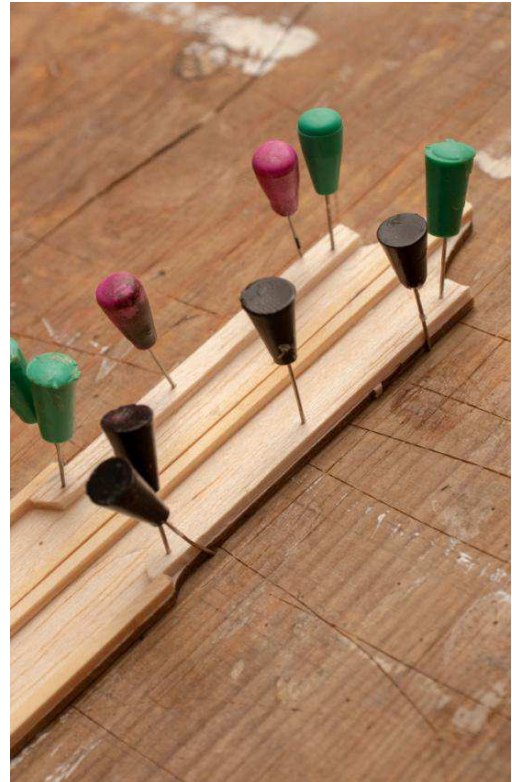
Complete balsa sides using white glue - total 6 joins



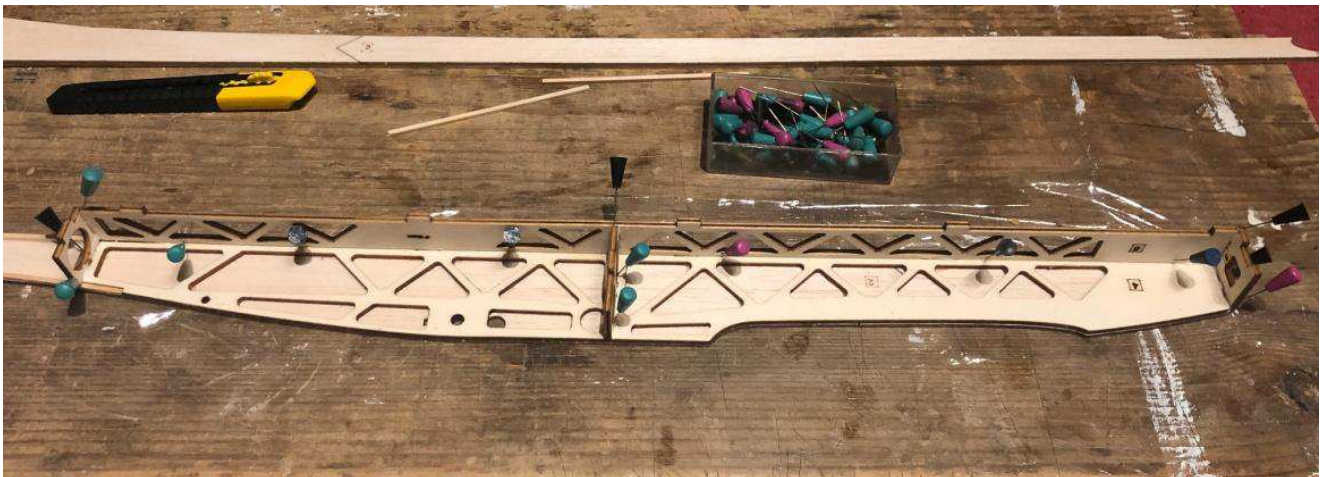
Glue plywood enforcement to balsa sides (be carefull - must be left and right pair).



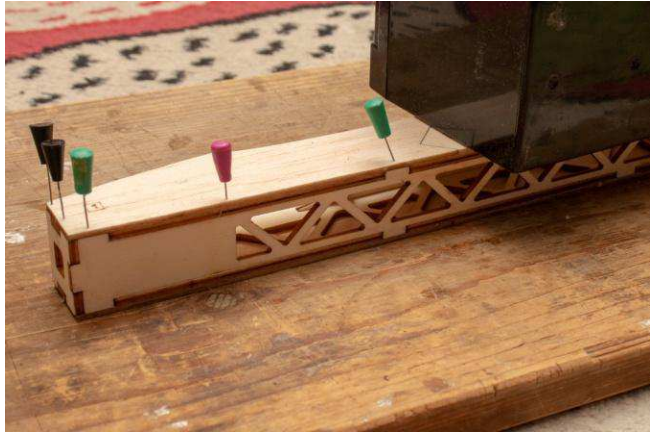
Glue perimeter pine moldings 2x2mm on back side of fuselage. Is good idea to spill joint covers with thin CA glue. Quality of this joints is critical for fuselage rigidity!



Prepare elevator holder on fuselage end.
Glue plywood floor enforcement and three spars. Check right angles of floor and spares compare to sides.



Glue second side, expect of pins is possible to use also some weights (old UPS Pb accu on pictures).



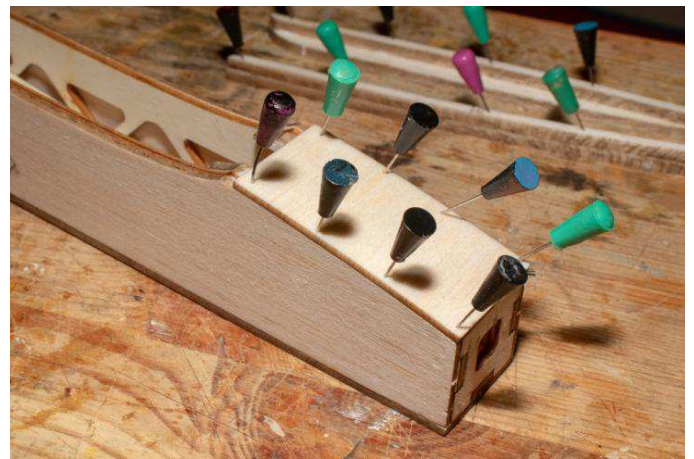
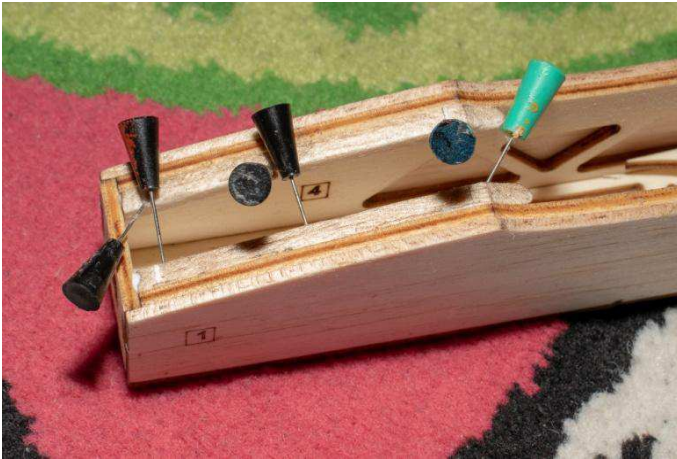
Next step is covering of fuselage floor side with balsa. You have to check, if fuselage is straight and with well alignment. Best practice is to glue one side of cover with fuselage side fixed to drawing.



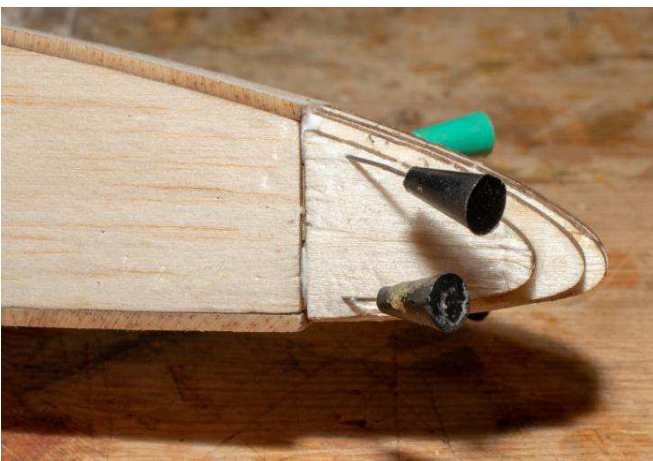
Complete balsa nose (white glue or Titebond).



In front side of fuselage glue top corner enforcements.
Then you can close front top side with balsa.



Attach prepared balsa nose to fuselage.
While using Titebond aliphatic resin sanding will be easier.



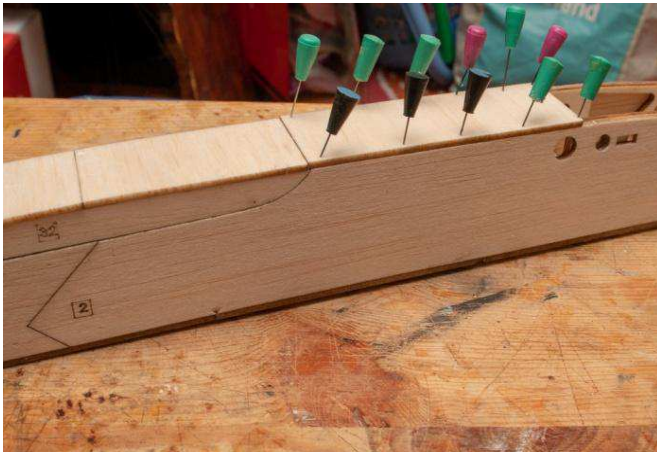
Next step is completing canopy. Glue corner enforcements to sides, then attach top canopy cover (balsa).



Cover top side of fuse with balsa parts. **Warning** – place up to wind is not possible to close before mounting towhook parts!!!

Head of hook holding screw you need to embed to touch plywood bottom. In other case balsa bottom should deform while tightening screw. Also cut groove for hook in balsa bottom (same as lasered on plywood bottom part).

At this moment of build is also necessarily to put and glue bowden for elevator control. Best idea is to fix bowden to fuselage sides by glue. Bowden should also be glued to fuselage spars.



Glue root ribs (plywood) to fuselage sides. Use main steel and secondary carbon joiner to fix position, take care for right angles. Glue magnets to root ribs, take care for magnet polarity!

After closing top side of fuselage is possible to start with sanding. See shape on plan, use accessory touch templates. Final sanding is best to complete using sanding sponge - for smooth and gentle surface. Open end of fuselage and canopy area could be protected by lacquer against humidity.

Wing

Wing consists from 6 parts - 2 pairs of center panel, inner wing tip and outer wing tip. In manual is described just building of center panel, for tips are described only differences.

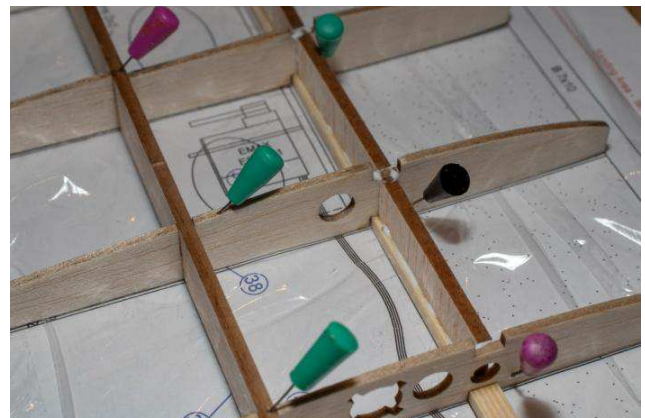
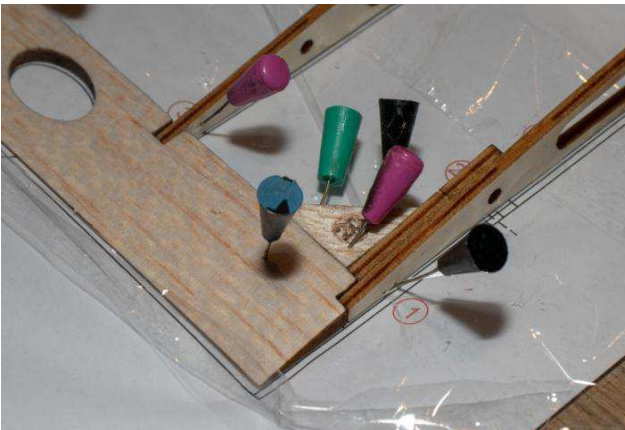
Panels are build on plan protected by thin clear foil using hobby pins. End ribs are glued using accessory template for setting correct angle.

Center panel

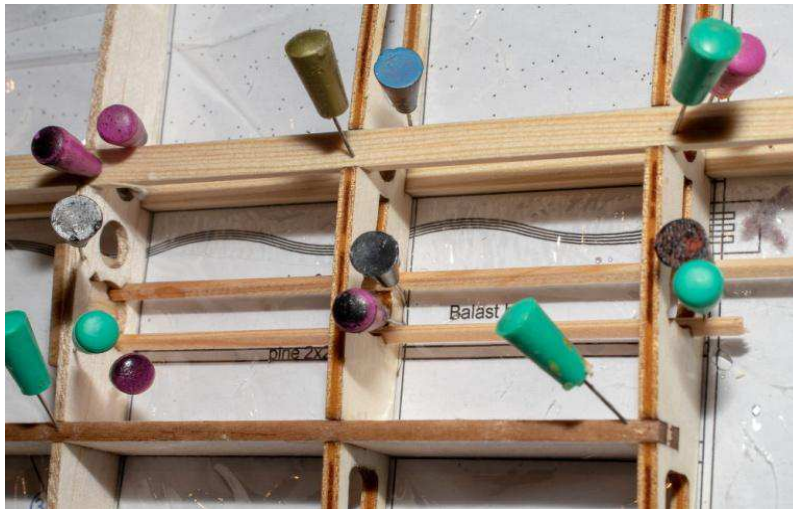
First step is preparation of trailing edge. You have to sand it to correct shape. Best practice is using special hobby jack-plane (using blades) for first steps, then sanding paper for final shape.



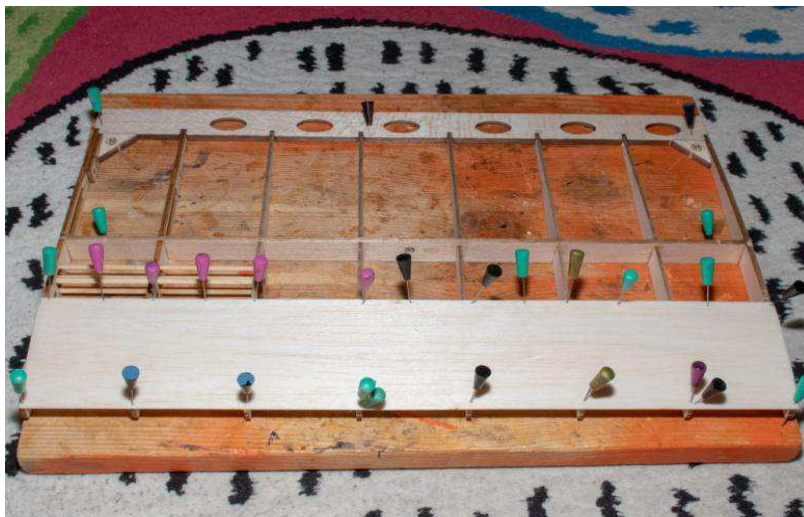
Fix trailing edge to plan using pins, glue ribs and bottom pine spars. Glue balsa auxiliary spar (part 33). Next step is glue of balsa uprights between ribs. Be careful - rigorous glue of uprights with ribs and pine spars is really critical for rigidity of wing! Next step is glue of top pine spar and corner reinforcements. As last step is possible to improve quality of joints with CA glue (using thin canilla).



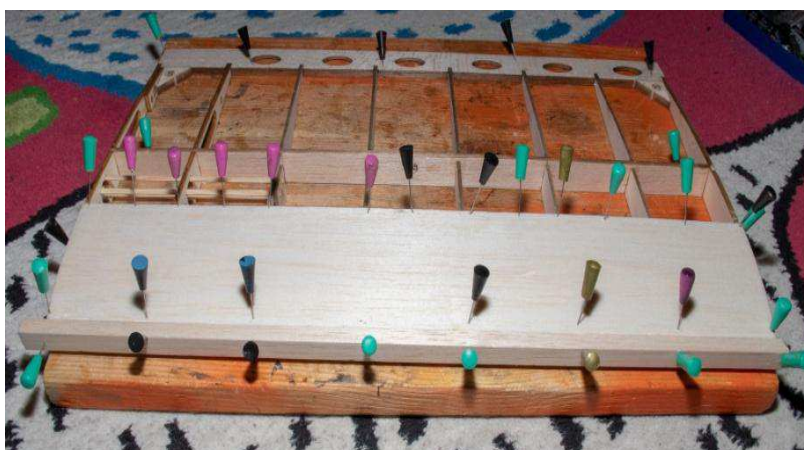
Fasten pine 2x2mm to create "cage" for ballast, close end with balsa part nr. 40.



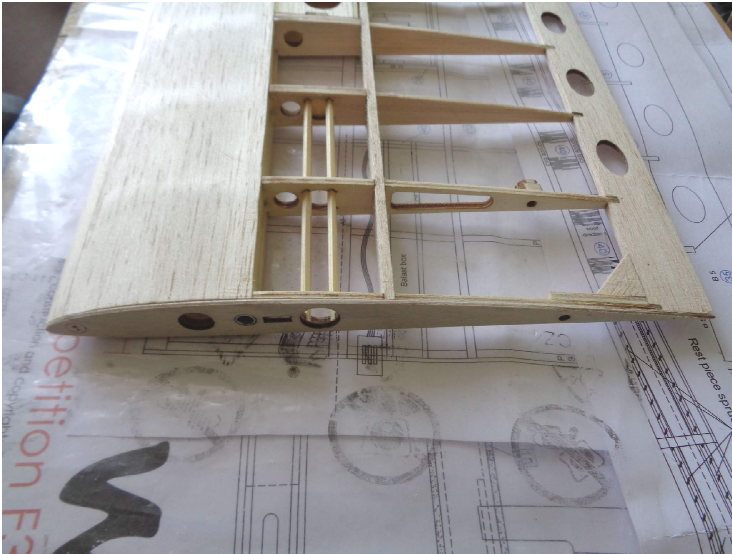
Now glue top rigid cover (balsa 1mm). Use white glue, fix with hobby pins. After glue drying is good idea to improve joints with ribs with CA glue. Only small amount of CA glue is enough, perfect quality of joints between ribs and top cover result in highly improved wing strenght in torsion. Cover should be fixed on every ribs!



Now glue leading edge balsa prism. Align edge of top cover with ribs before fastening of leading edge.



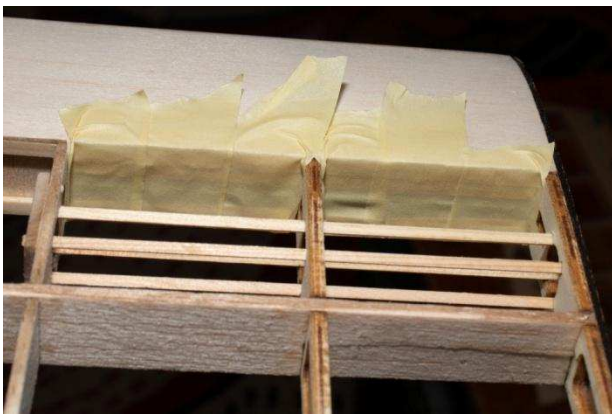
Add plywood root rib, take care to holes for joiners.



Rough build of center panel is complete, now is time for finishing.
Add aluminium tube for joiner, fill big spaces between tube and spar with pieces of pine.



Put tape to space, now fill rest of space using epoxy and filler (microbalons, carbosil, etc). Be carefull - this fill is very important for strenght of this wing part! Potting with epoxy and filler made important "upright".



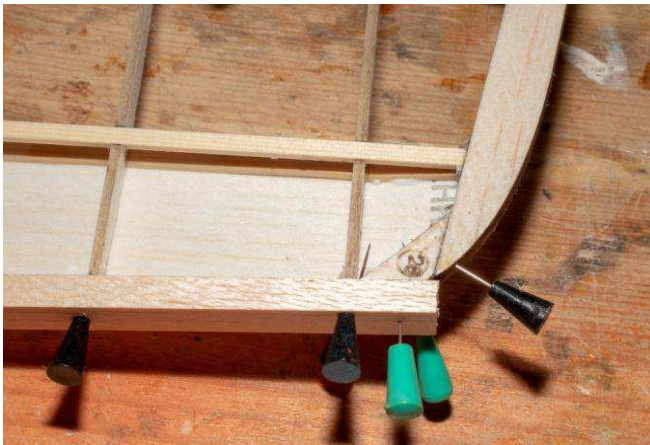
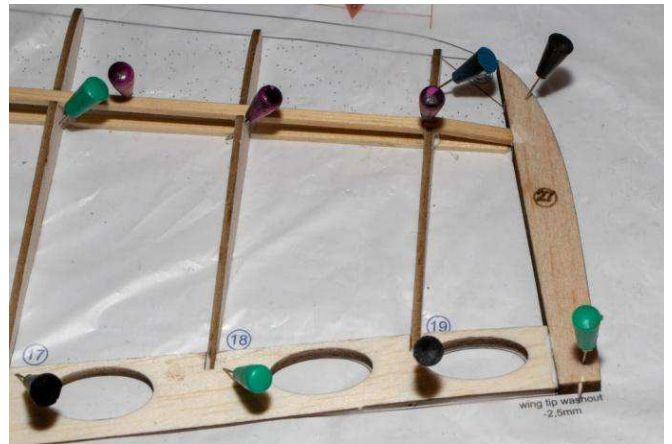


Glue balsa plate for spoiler servo, later here will be servo frame.

Inner and outer wing tips

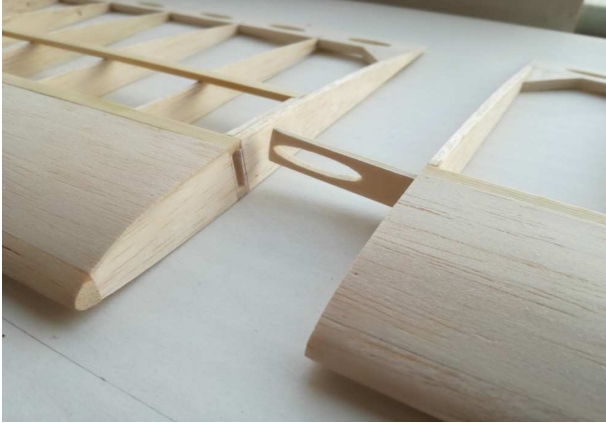
Building is similar as center panel. Take care while preparing trailing edge - not only wedge shape, but it is also thinner at the end, Check correct angle while glue ribs on sides - use attached template. Carefully - angles are different for inner and outer tips.

On outer tip take care fore “negative distortion”, see plan. Pads under end ribs should help with this. Corner triangle enforcements should be glue well aligned with bottom edge of ribs.

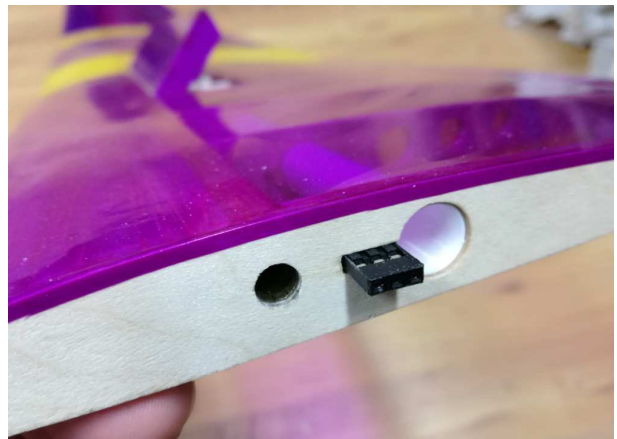
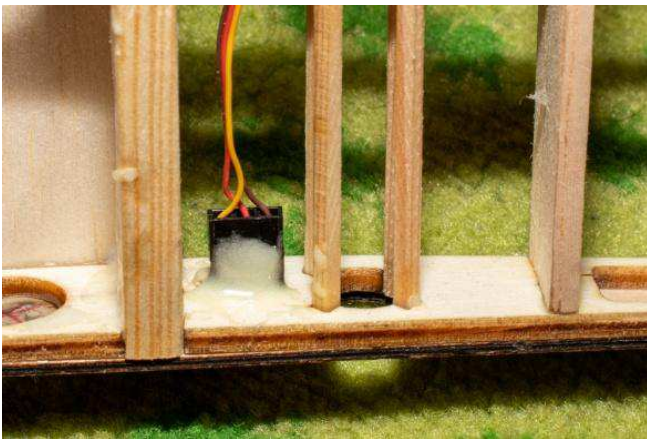


Finishing of wings, completing dihedral

Complete leading edge with hobby jack-plane and sandpaper, use attached plywood templates. See plan - every template is for other part of leading edge. Clean trailing edge, joins with ribs, etc Now is time to join wing parts to dihedral, using plywood joiners. Be carefull - both sides need to have same dihedral!



Before covering you also need to align cable for spoiler servo. Is possible to add cable later, but it will be difficult to create fixed glue of connector after covering.



Spoilers

Frame spoilers with pine 2x2mm and glue end ribs.



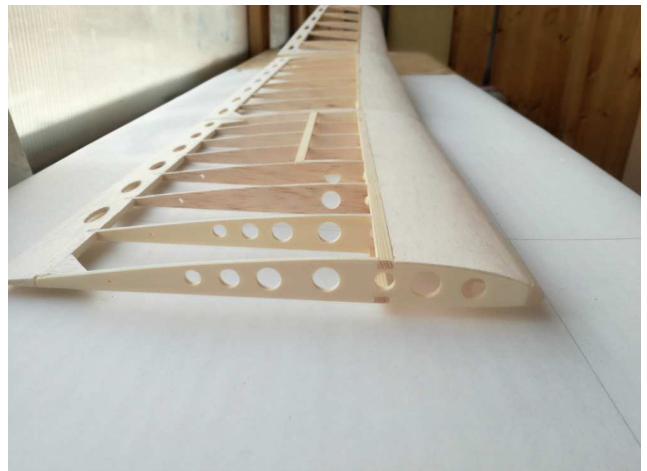
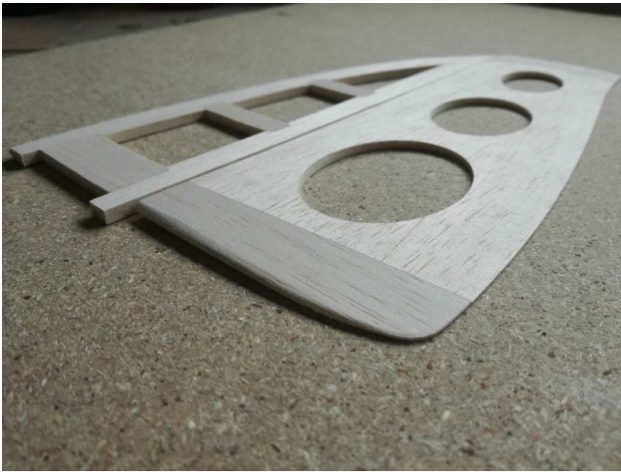
Covering of model

Clean all model parts from dust before covering, Is also possible to use lacquer (very thin with big dilution). Use covering film, optimal alternative are light polyester type, for example transparent Oracover Light. For wing center panels and fuselage is also possible to use heavier, but more rigid type of Oracover. For fuselage is better to use non transparent film. Prefer significant and contrast combination of colors for good visibility. At center panels cover also place for spoiler, film at this place will be cutted later. Tension of cover (using hot air) complete in more steps and start with lower temperature...

Fix wing to template, while stretching cover to prevent any distorsion. Best way is to stretch both sides (top and bottom) through holes in template.

Elevator and rudder cover also stretch after fixing parts to straight plate.

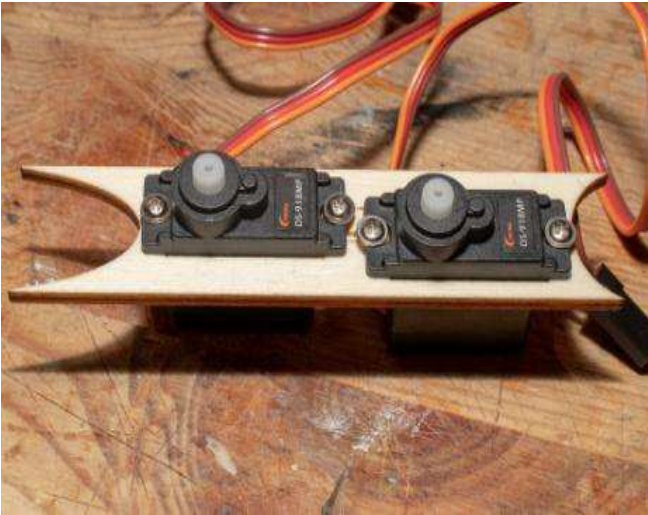
Straight and non distorted wing and elevator is key to success!!



Completing model and RC installation

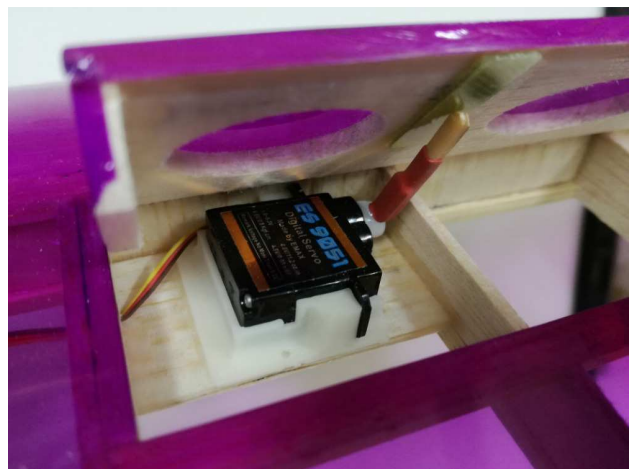
First glue elevator to fuselage, check position with mounted wing. Then glue rudder, check right angle with elevator.

Prepare servo mount plate, modify holes while using different servos.



Now temporarily mount model (fix moving parts of tail with small pieces of tape, add bowdens etc.). Put inside servo plate without glue, battery and receiver, move servos and other part to optimal position for requested CG (80mm from leading edge for start). Glue servo plate to optimal position, adjust length of bowdens and complete tail surfaces control. Use Z-bend at elevator side, clevis or ball joint at servo side. For rudder use included Dynema line and springs. Fix knots with drop of CA glue.

For spoilers glue 3D printed frames and install servos. Glue extension (pine 2x2mm) to servo horn, fix with shrinkable tape.



First flights

The model flies at the recommended center of gravity and deflections fine, without any problems. It is important that the middle parts and inner tips are straight and the negative settings on the outer tips are the same. It is also advisable to balance both sides of the wing by gluing a piece of lead into the space of the spoiler servos so that both halves have the same weight.

The position of the tow hook is dependent on the position of the center of gravity and weather conditions, so it can be easily and quickly adjusted. The hook should be about 1-2mm in front of the center of gravity. The more the front, the easier is control of model, but the height is not so great. When the hook is more rearward, the situation is reversed. Personally I use the special flight mode "start", the hook behind the center of gravity and elevator is slightly suppressed at this flight mode Reached height is greater, but the model needs more control when towing.



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