

Zlín Z-37A Čmelák ("Bumblebee") -
1 530mm



Assembly Instructions and recommended equipment of the RC model

Technical information:

Wingspan: 1530 mm
Overall Length: 920 mm
Flying weight: ~1 700g
RC Functions: Rudder, elevator, ailerons, motor (throttle), flaps (optional: spreading unit activation)

Recommended equipment:

Brushless motor:	Turnigy 3639 1100kv (~500W) + shaft extension (~70 mm long)	1 pc 1 pc
Electronic Speed Controller (ESC):	40 A	1 pc
Propeller:	APC 13x4" + Propeller adapter	1 pc
Servos:	20 grams with Metal Gear	6 pc
Battery:	3S Li-pol 2700-3000 mAh	
Receiver:	minimum 5 channels	

Parts included in the set:

Fuselage parts	4 pc
Center section of the wing with flaps	1 pc
Outer Wing parts with flaps (Left + right)	2 pc
Outer Wing parts with ailerons (Left + right)	2 pc
Engine cowling	1 pc
Engine shutter – 3D printed part	1 pc
Walking grid – 3D printed part	1 pc
Tail group (empennage)	3 pc
Plastic nuts + screws	2+2 pc
Plywood plate	1 pc
Main Landing gear wire (Left + right)	2 pc
Tail Landing gear wire	1 pc
Main Landing gear plastic covers	2 pc
Tail Landing gear plastic cover	1 pc
Main Landing gear wheels	2 pc
Tail Landing gear wheel	1 pc
Steel wire for pushrods (∅ 1 mm)	1 pc
Wheel stop collars ∅ 4 mm	2 pc
Wheel stop collar ∅ 2 mm	1 pc
Foil for windscreen & windows	3 pc
Plastic tubes for landing gear braces	
Set of Fiberglass parts (engine bulkheads, control horns, hinge levers)	

Parts needed for the finishing of the model:

Carbon Strip (stringer) - 5x0,6 mm	3 pc
Pushrod connectors (linkage stoppers)	6 pc

Adhesives:

- Cyanoacrylate (CA) glue (super glue) thin + medium
- Activator (Kicker) for Cyanoacrylate glue
- Polyurethane (PU) glue (e.g. Ponal PUR glue in bottle or UHU PU MAX in bottle or Purex Rapid)
- Epoxy

Tools needed to assemble the model:

A sharp knife or scalpel, pins, drywall sanding mesh, steel ruler, soldering iron, paint (water based, synthetic or color sprays: **Montana**, Duplicolor, PrismaColor...) and common modelling tools.

All parts are glued with super glue (CA), unless stated otherwise.

Before starting the assembly, read carefully the Assembly Instructions!

Assembly procedure:

(If you purchased a spreader unit along with the model and you want to spread, remember to create the space in the fuselage behind the cockpit – hopper (spreader material reservoir). It can be made later as well, but it will be more difficult.

When assembling the fuselage, some weight can be saved by making the rear fuselage lighter - by scooping out material, this can avoid additional weight in the front. It must be noted, however, that this may affect the durability of the model. We recommend leaving **a wall that is at least 15-20 mm thick**. The electronics will be located inside the fuselage above the wing, the battery and Electronic Speed Controller (ESC) between the wing and the engine mount.

Wing:

(The wing is attached to the fuselage by two screws and dowels).

All larger EPP (Extruded Poly-Propylene) parts are to be glued by the following procedure:

Apply the PU glue to one of the surfaces to be joined and only in the center of the part, approx. 8-10 mm from the outside perimeter of the part shall not be covered with the PU glue to avoid the PU glue foaming out of the surface and making the joint less attractive. Then put both glued parts together, align them and fix together with pins. When both surfaces match each other, apply thin CA glue to the whole outside perimeter of the joint. The CA glue prevents the PU glue to foam out of the joint.

First glue the parts of the outboard wing sections together, i.e. glue the part with the aileron to the corresponding part with the flap cutout. Do this for both outboard wing sections. Then glue both outboard wing sections to the wing mid section.

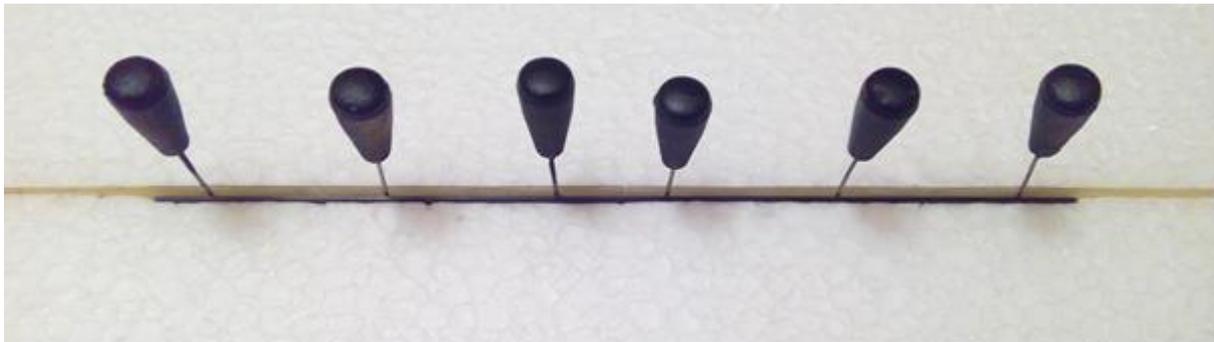


Make a slot with a sharp knife into the underside of the wing, for the milled fiberglass spars and carbon stringers, 90 mm from the leading edge at the wingcentre (approx. 60 mm at the wingtips). The bottom spars have V-Form for the wing dihedral and an eyelet roughly in the center of the bottom side for mounting of the landing gear. Extend the spars with a 5x0.6mm carbon stringer till the end of the wings with an approximate overlap of 65 mm on the spars. With the remaining part of the stringer, connect both spars in the wing mid section.



Cut the slot for the spars and stringers on the upper side of the wing in the same way. (Make the slot for the spars with a sharp knife and push them in - you can use a small hammer). Level the wing on a flat surface (table or floor), check the wing is straight and with the same dihedral on both wing tips, then glue the spars and stringers into the wing with thin CA glue.

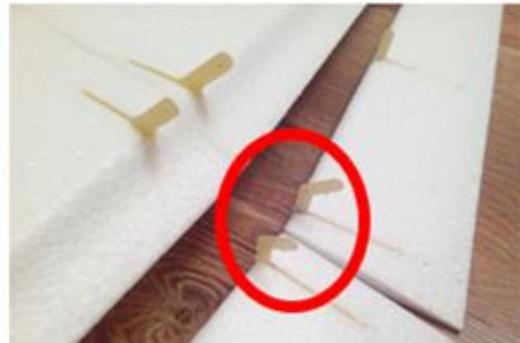
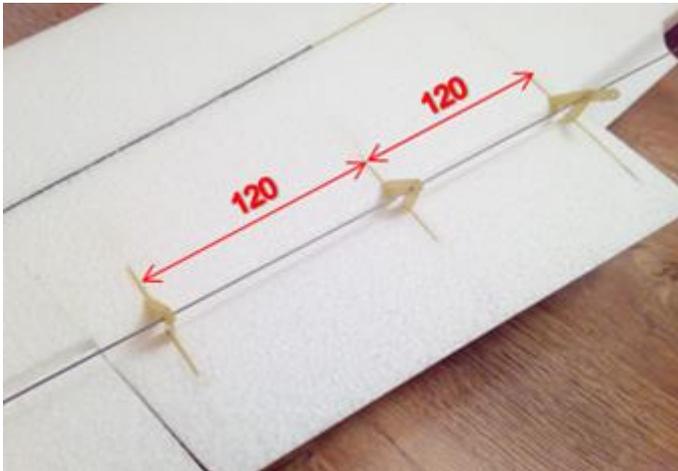
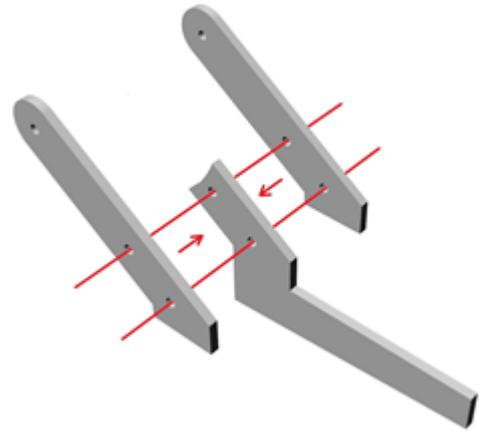
"Spread" the spar and carbon stringer joint so that the glue soaks deeper inside.



Level the flap according to the aileron and attach with pins from top (the depth of the wing in the mid section including the flap is 298 mm).



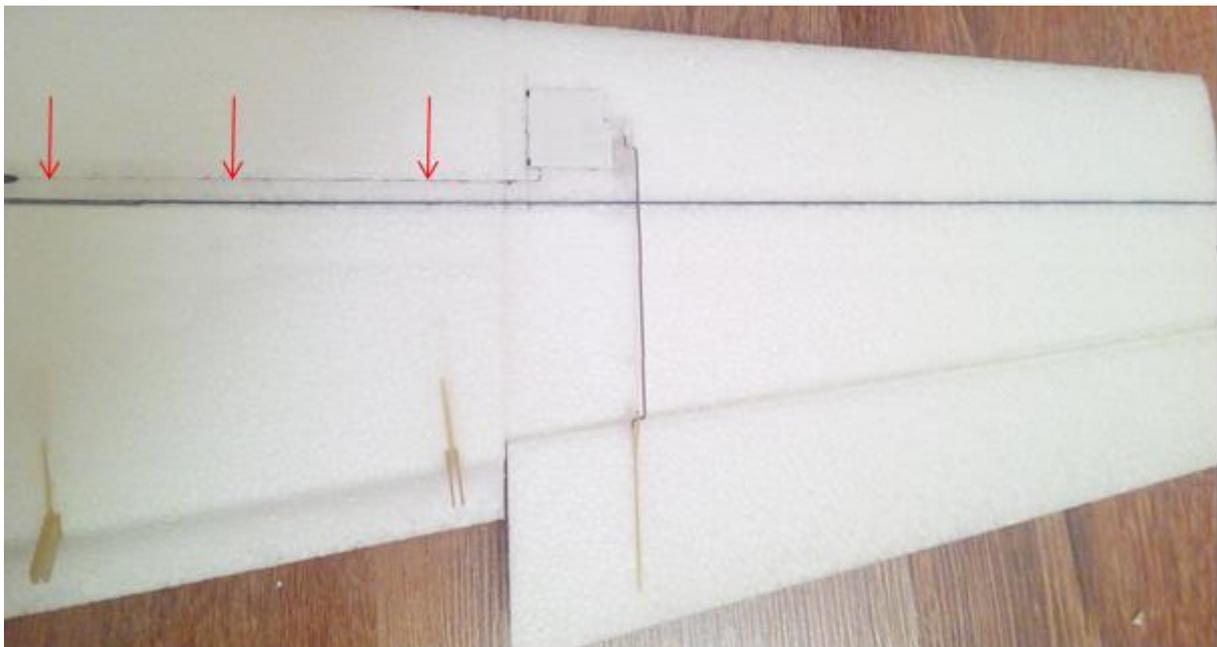
Cut slots at a right angle into the flaps at a distance of 120 mm for the 90° levers creating hinges (shorter inner flaps in the wing mid section - 130mm distance). Use the extended levers in the flaps (for flaps control) on the place, where the wing mid section is joined with the outboard wing section. Cut slots into the wing for the opposite parts of the hinges, which have to be glued together according the following image (push two pieces of wire through the parts, then glue them together) →



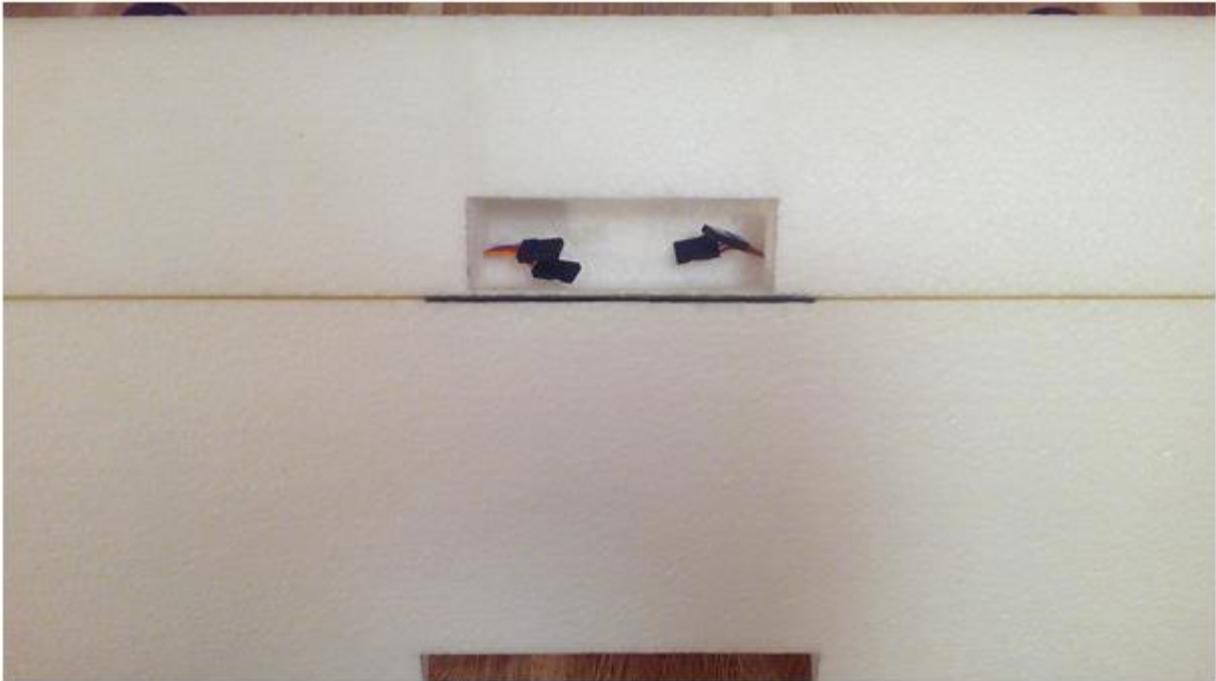
Before gluing all the hinge-levers into the wing and flaps, push a long piece of steel wire through all hinges of each flap in order to level the hinges and properly align the flaps with the wing. (Check for ongoing trailing edge and maintaining the shape of the airfoil). Glue all the hinge parts with thin CA.

After you glue the hinges in place, remove the steel wire and clip short pins, about 5 mm long, push them back into the hinges, and add a drop of thicker CA glue on both sides carefully.

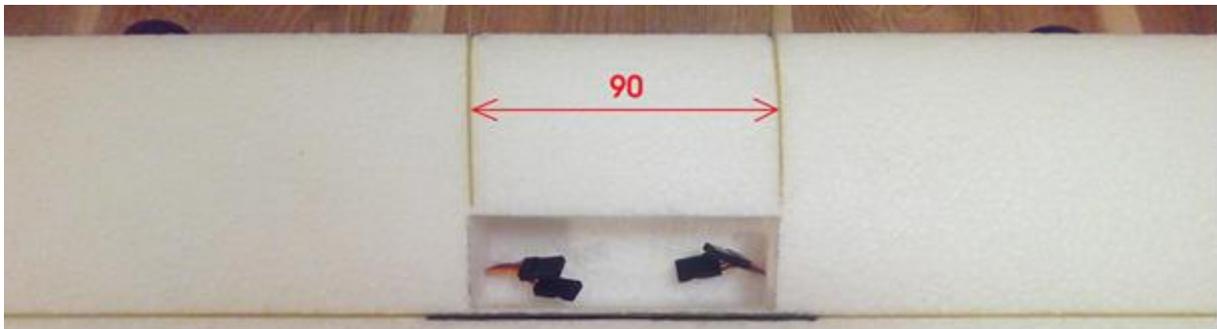
Cut the aileron servos into the wings ideally in front of the stringer and cut a slot for the lever into the aileron in the servo lever axis. Push the servo cables into a slot made with knife and bring them (along with the flap servo cables) to the center.



Create a "pocket" in the mid wing section from the top of the profile (covered by the fuselage), and lead all the servo cables from the ailerons and flaps there and add connectors.



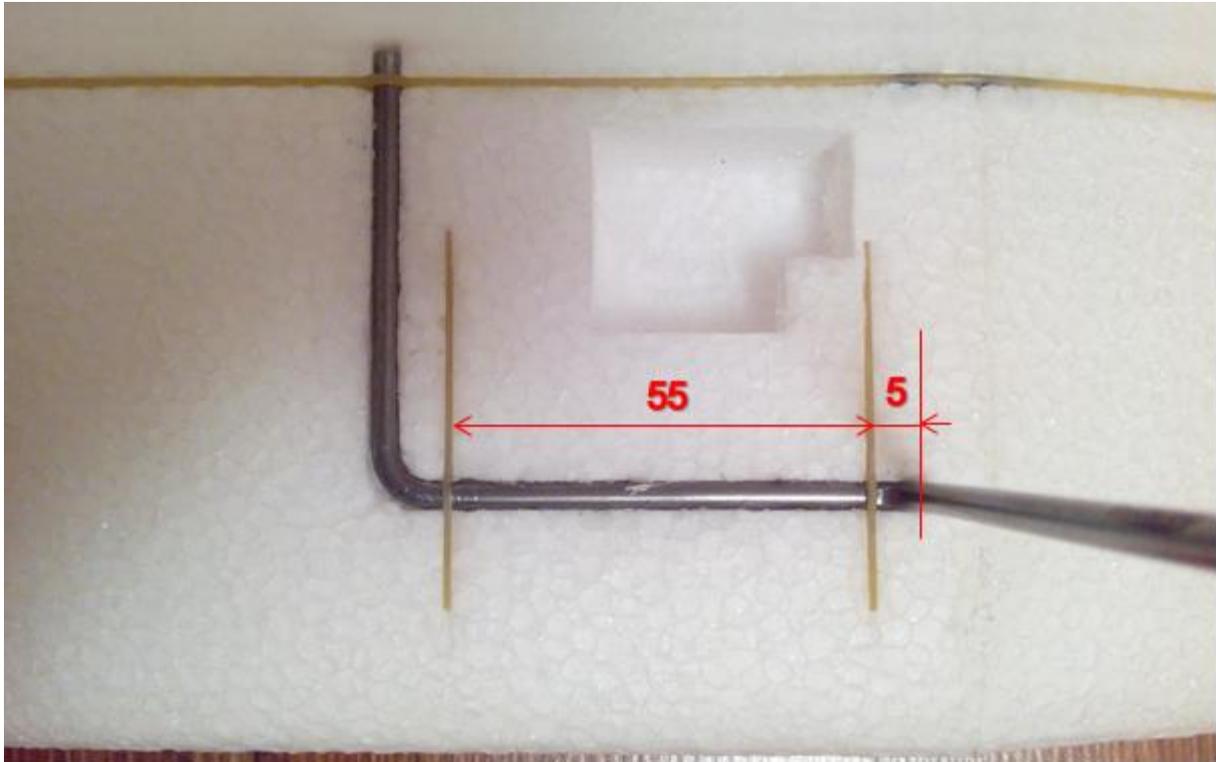
In the center of the leading edge of the wing mid section, cut two vertical slots at a distance of 90 mm for connecting plates - dowels. Mark the place of the cut according to the counterpart. → **Take particular care here !!!**



Glue the fiberglass plate for even distribution of screw pressure to the bottom side of the wing profile in the centre of the wing.



Place the landing gear wire on the bottom side of the wing and mark its location (approximately 5 mm of the wire will be inserted through the spar). Create a 4 mm wide slot in the EPP for the landing gear wire so that it is aligned with the wing profile. Place the roughened fiber glass plates on the wire at a distance of 55 mm and cut slots and push the plates into the wing mid section. **DON'T GLUE THEM YET.** Place the flap servos in front of the spar with the levers as close to the wing mid and outboard section joint as possible. Lead the servo cables underneath the landing gear towards the middle of the wing - along with the aileron servo cables.



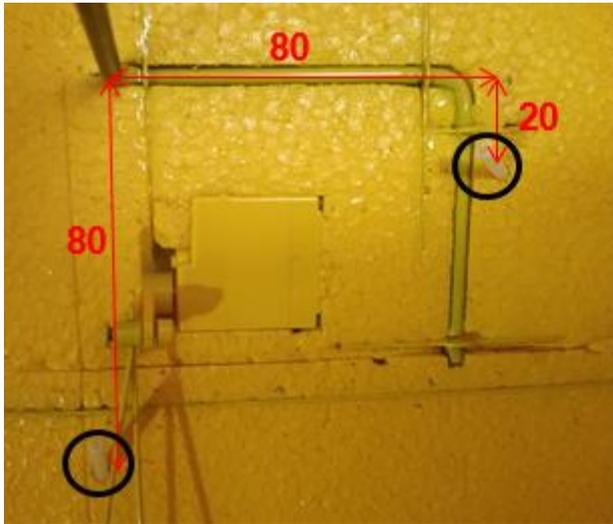
After comparing both landing gear wire positions, thoroughly glue the fiberglass with thin CA glue into the wing. Don't glue the wires itself.

Glue the landing gear plastic covers to the landing gear wire with epoxy, paying attention to the correct orientation. (Extruded glue can be wiped off with a rag soaked with acetone - it does not damage the plastic).

The plastic covers can be painted with the same paint as the whole model after degreasing with acetone.

After the wing was painted:

Insert the \varnothing 2 mm plastic tubes in the designated distances from the main landing gear, under the angle of the bracing struts, 20-30 mm deep, let them protrude 40-50 mm and glue them into the wing. They will serve as a guide for the bracing struts when the landing gear bends/springs. Prepare the struts from the \varnothing 3 mm tube at an approximate length of 100 mm, paint them, slide them on to the \varnothing 2 mm plastic tubes and glue them to the prepared pins on the landing gear plastic covers. Struts facing backwards (to the trailing edge) must be slightly shorter because of the bending/springing of the landing gear.



Install the wheels and secure them with stop collars.

Glue the slots to the end of the wing using fiberglass holders after the wing and slots painting.



Fuselage:

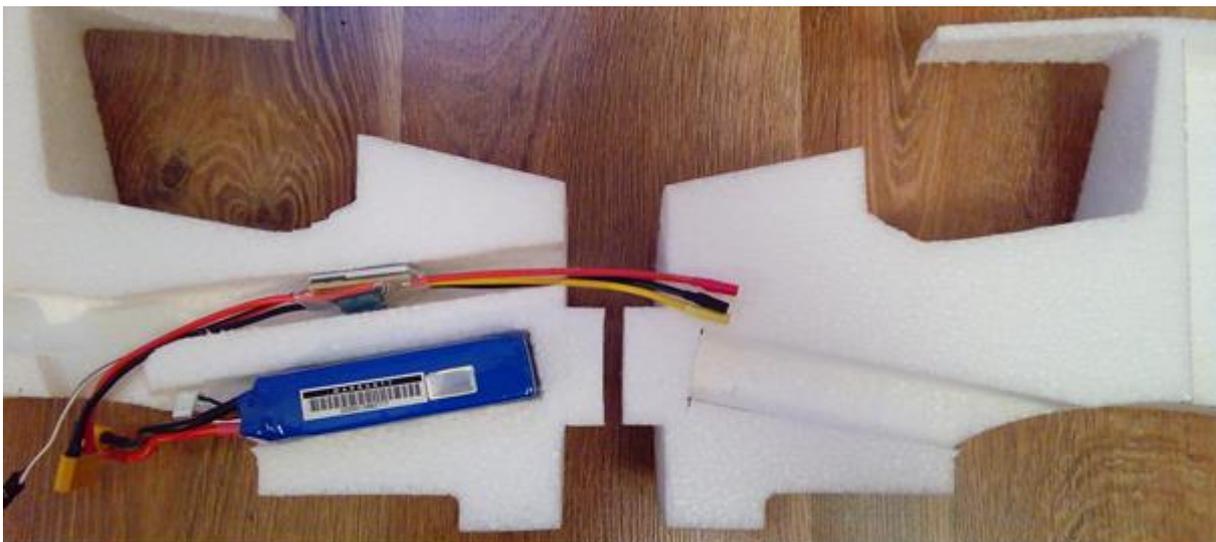
Cut the ruder servo vertically into the side of the vertical stabilizer in its widest point. Cut the elevator servo into the fuselage under the horizontal stabilizer. Create a groove in the fuselage for servo cables all the way to the wing mid section.



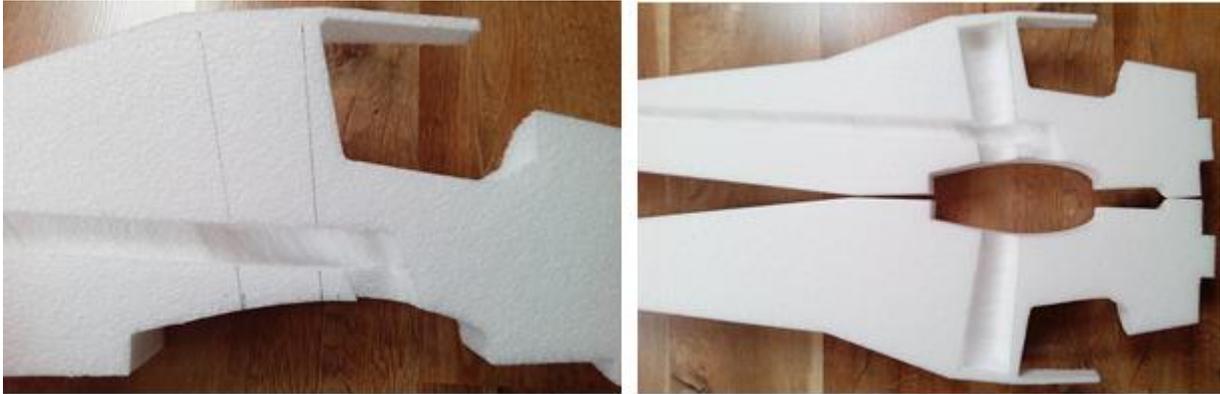
Place the pre-bent tail landing gear wire with one installed fiberglass plate (20x40 mm) at the level of horizontal stabilizer leading edge on the fuselage inner side. Cut the fiberglass plate into the upper part of the fuselage and cut a groove for the gear wire. Glue to the fiberglass plate into the fuselage carefully, not to glue the wire itself. The second fiberglass plate will be glued on later after the fuselage was glued together. Create the groove for the landing gear wire and the upper fiberglass plate also in the opposite half of the fuselage.



Scoop out enough space for the Electronic Speed Controller in the front bottom part of the fuselage. Lead the groove for the power cables above the wing and forward to the engine bulkhead. Do the same for the battery.



At this point you can prepare space for the hopper if the spreader will be used, ideally a cylindrical shape with a diameter up to 60 mm.



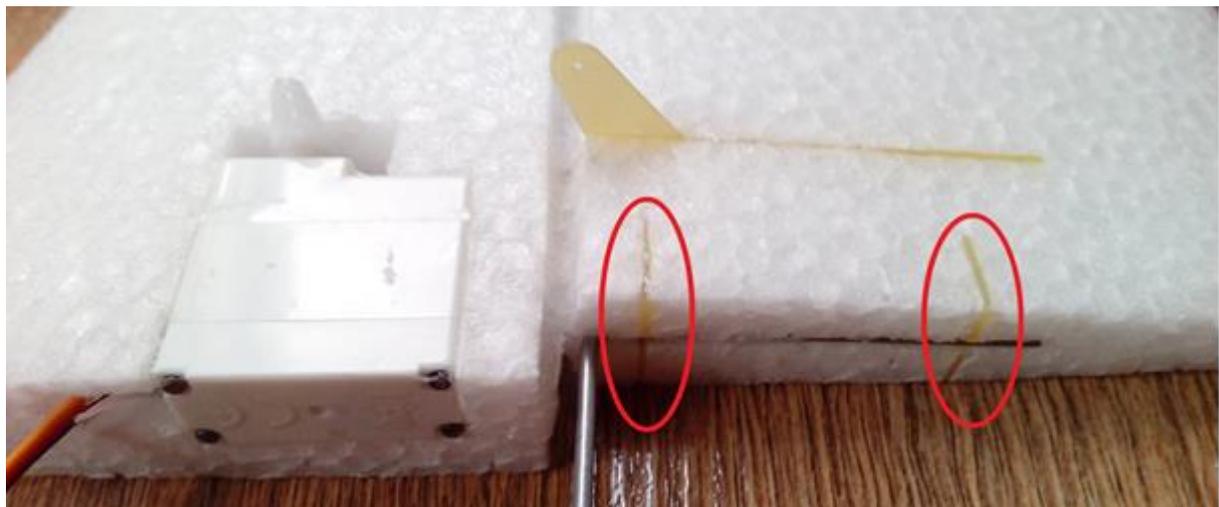
Place the extension servo cables connected to the servos into the prepared groove. Glue both fuselage halves together, apply the same method as described above in the wing section (PU + CA glue). Do not apply glue on or around the tail landing gear wire.



Glue together both parts of the horizontal tail surface and reinforce it with a 5x0.6 carbon stringer along the entire length from one side. Cut and glue the control lever into the elevator in the servo lever axis using CA (1 from 4 pcs - different shapes than those used as the flap hinges). Carefully glue the horizontal tail surface to the fuselage with PU + CA glue. Before applying CA, check the perpendicularity to the fuselage.



Cut and push two fiberglass reinforcements with a cutout for the tail landing gear wire into rudder – tail landing gear control. Cut a groove into the rudder from bottom from the hinge to the back, so that the wire can be inserted into it and the prepared reinforcements. Center the servo and screw the lever on, wrap with scotch tape and glue into the vertical stabilizer at the widest point. Cut the control lever into the rudder in the axis of the servo lever. Glue all fiberglass parts into the rudder using thin CA. Glue the vertical stabilizer to the fuselage with PU glue and the perimeter with CA glue. Check the alignment with the fuselage middle line and the perpendicularity to the horizontal stabilizer.



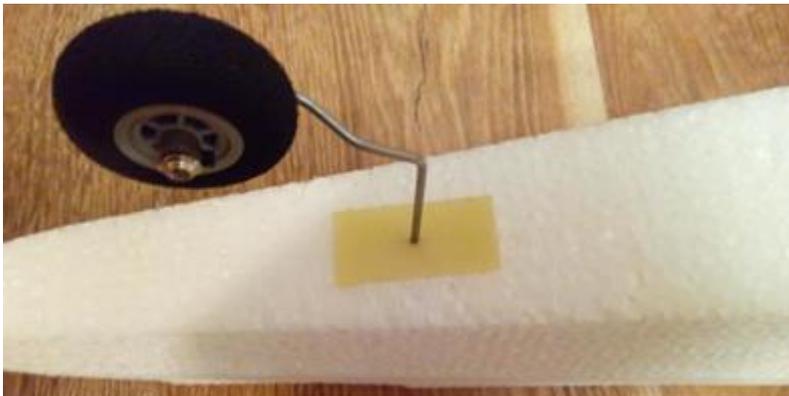
Roughen the fiberglass bulkhead with grooves for wing dowels and glue it into the fuselage on the front face side of the wing mid section area. Cut slots into the fuselage partially to make it perpendicular. Cut the plywood plate with plastic nuts partially into the fuselage wing opening at the rear position and glue with PU glue. The plywood plate shall be parallel to the fiberglass plate with holes for screws glued on the wing.



Roughen the engine bulkhead and glue it with the cable cutout to the upper side. The mounting holes for the engine are drilled asymmetrically for setting the downthrust and sidethrust of the engine, and it can therefore **only be glued with one position** - the engine shall be placed more in the top-right corner as viewed from front. Mount the engine and align it slightly to the right and downward (spacer ± 4 mm in the top-right corner as viewed from front).



Carefully glue the remaining fiberglass plate to the fuselage as a reinforcement of the tail landing gear, avoiding gluing the wire itself. Secure the wheel with the stop collar.



Glue the engine cowling to the fuselage. Paint the shutter with silver paint and press in the cowling. Glue the cowl flaps behind the engine cowling.



NOTE: The shutter shall not be exposed to temperatures above 45 °C (for example in Summer left in car), otherwise deformation of the shutter may occur.

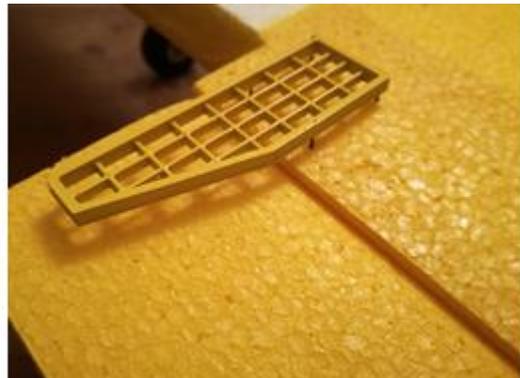
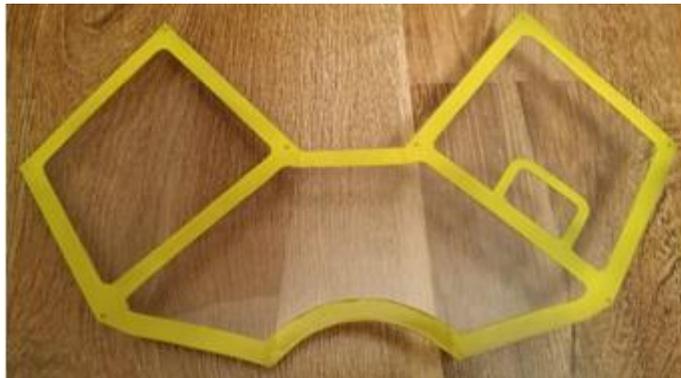
Place a plastic film on the walls of the hopper - firm transparent file folders will be sufficient, and pin them in place. The plastic film can go into the wing, or all the way to the spreader.

Scoop out enough space for the receiver and all other cables in the fuselage - preferably opposite the "pocket" in the wing.

After painting the model, use CA glue to attach the tail landing gear plastic cover landing gear wire (The top of the cover can be shortened as needed). Apply the glue carefully to avoid gluing it to the fuselage!



Frame the cockpit windscreen with the enclosed sticker and pin it to the fuselage. **Before the sticker is peeled off from the paper, it can be painted with the same color as the rest of the model.** Glue the rear windows on with a few drops of CA glue. Glue the walking grid onto 4 pieces of wire in the perimeter of the grid, push and glue it on the right half of the wing next to the fuselage.

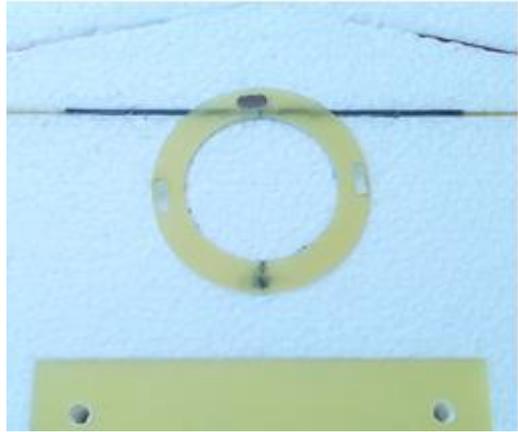


Installation of the spreader:

Place the spreader just behind the spar on the fiberglass ring (included in basic kit) glued to the wing.

Glue the ring so that the oval hole for the cable is in front of the spar, making it easier to pull the cable into the "pocket" with all the other connectors.

To connect the spreader to the hopper, it is necessary to thoroughly measure everything and cut out a circular opening through the wing after the fuselage is finished. To ensure the spreader is secured in its place, drill a tiny hole in the spreader and fiberglass ring and secure with a pin. The motor shall be powered by 5-12 Volts. The spreader motor can be controlled by the electronics from an old servo with stripped gears – connect the spreader motor instead of the servo motor and hide the entire electronics with the potentiometer in shrink tube.



Included in the spreader set is the hopper cover. After painting, bend 2 pieces of wire to form a "U" shape, push them thru the eyelets, insert and glue them into the EPP.



Bread crumbs spreading works the best.... ☺

Installation of telescopic landing gear:

Oleo struts can be retrofitted. Cut the existing landing gear wire off with a Dremel like tool 20-25 mm from the wing. Push the legs onto a wire and remove some EPP from the wing, so the new landing gear can be inserted "fully". Tighten screws.

Tip: For easier painting, the legs can be wrapped in shrink tube (the embossment will remain visible, if there is some text on the shrink tube, it can be usually removed with alcohol).



Finishing of the model:

Sand the model with a sanding mesh for drywall for a better finish, if required. Connect the complete electronics and check the function. Check the downthrust and sidethrust of the motor, slightly down and to the right in flight direction. Secure the servo levers with screws and glue the servos with hot glue gun in place. Find the correct battery position above the wing in the fuselage (you can use Velcro) in order to balance the weight of the model - check the center of gravity. You can route the cables from the battery and ESC connectors under the wing for easier use.

Paint the model with either water-based paints or spray paint – we recommend **Montana** spray paint, it is cheap and has excellent adhesion (or DupliColor, PrismaColor, ...).

The model on the pictures is painted with spray paint DupliColor with color code **RAL 1021**. From other paint manufacturers also RAL 1023 may look good.

1:1 anti-slip strips for the wings and tail numbers in the correct sizes are ready to print at the end of this instructions. If you wish to make your own tail numbers, create it in MS Word: font is **Arial Narrow**, switch on **Bolt**, font size for wings is **250** and for the fuselage **150**.

Recommended control surface travel:

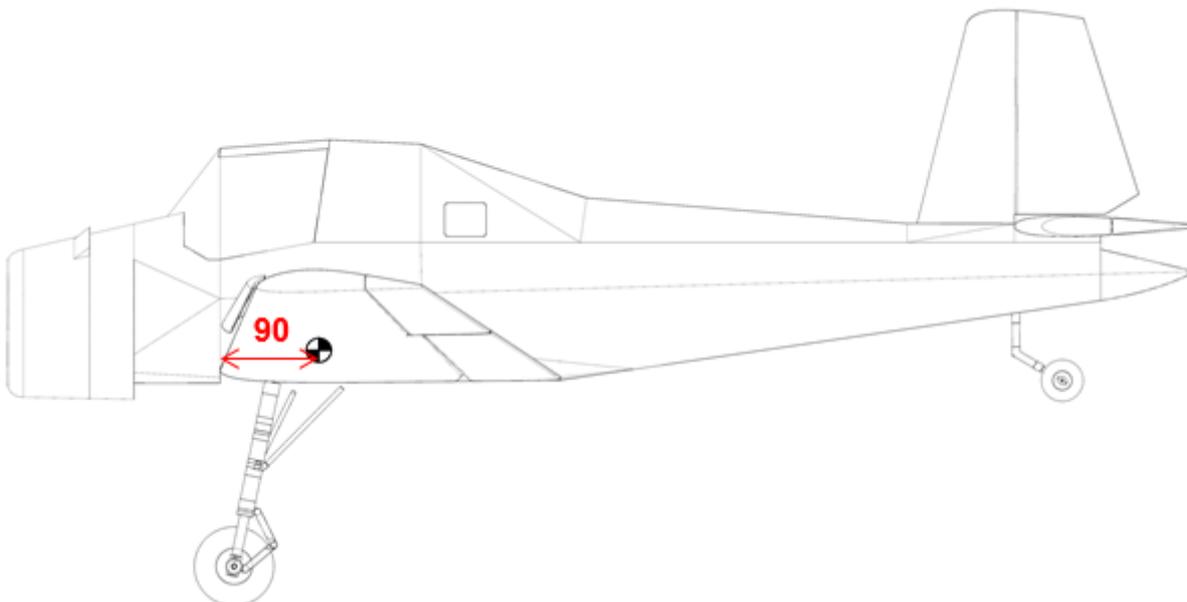
Ailerons - up 25 mm, down 15 mm

Elevator – up 15mm, down 15mm

Rudder - to both sides 35 mm

Flaps – uplift 30° - brakes 70°

Center of gravity: should be at a position 90-95 mm aft of the leading edge, at the fuselage sides. Mark this point on both sides of the wing. Turn the model upside down and support the model in the marked positions. The model should balance leveled, otherwise change the position of the battery forward or aft. Mark the position of the battery, when correct position is found.



First flight:

If possible, choose a windless day for the first flight. If you don't have much experience with test-flying of a model, please ask a more experienced model buddy to check the model and to help with the maiden flight.

A hard surface is recommended for take-off, grass should be short and the surface should be flat. We do not recommend throwing the model due to its size.

Always take off against the wind!

After reaching a safe altitude, trim the model on the transmitter so that it flies straight. Test whether the model is flying straight without power as well as with full throttle, and align the engine by changing the spacer between the motor bulkhead and the motor accordingly, if necessary.

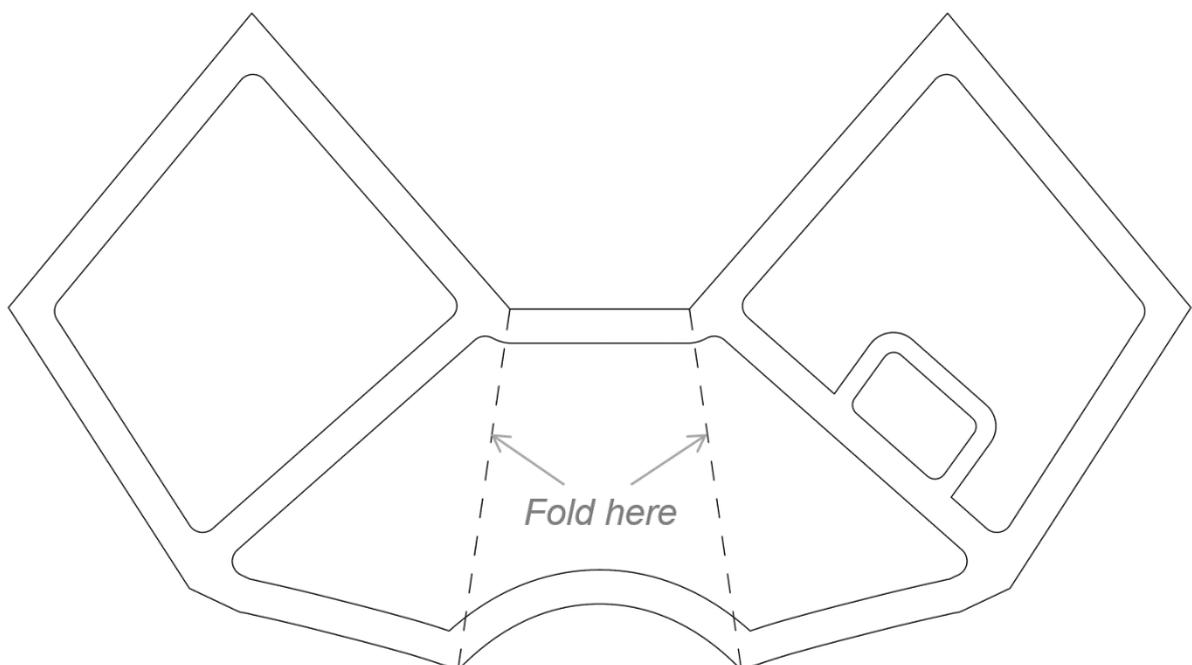
If you have any questions or comments, please contact us!

And don't forget to send us pictures from your flights!!!

We wish you many pleasant flights!

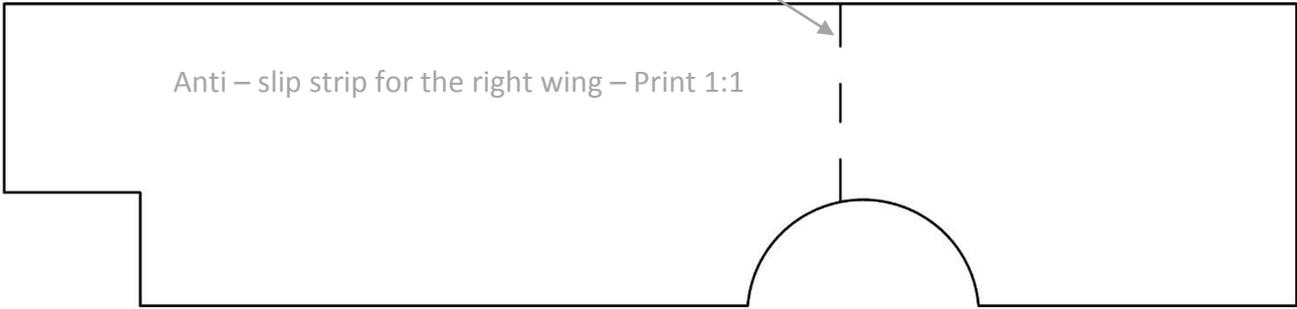
Kor-Model

Cockpit – print 1:1

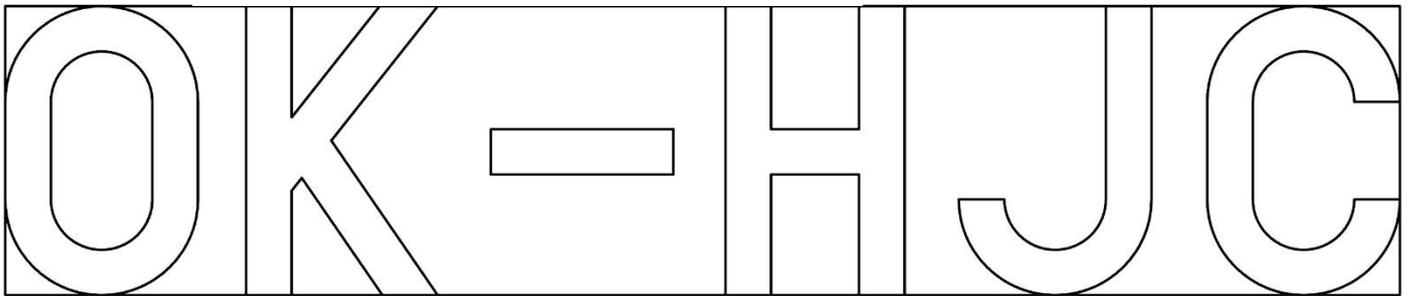




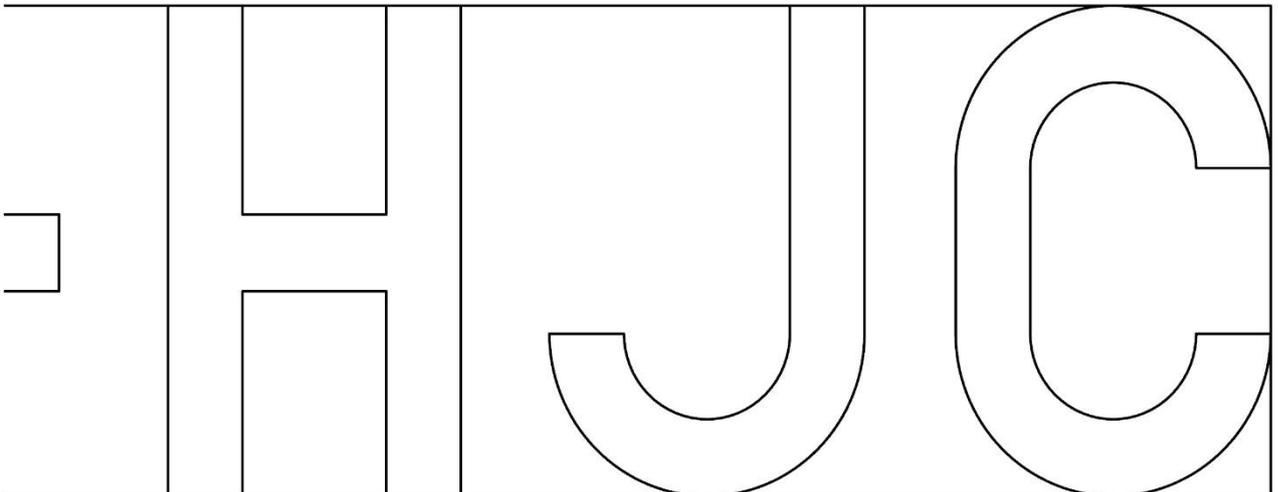
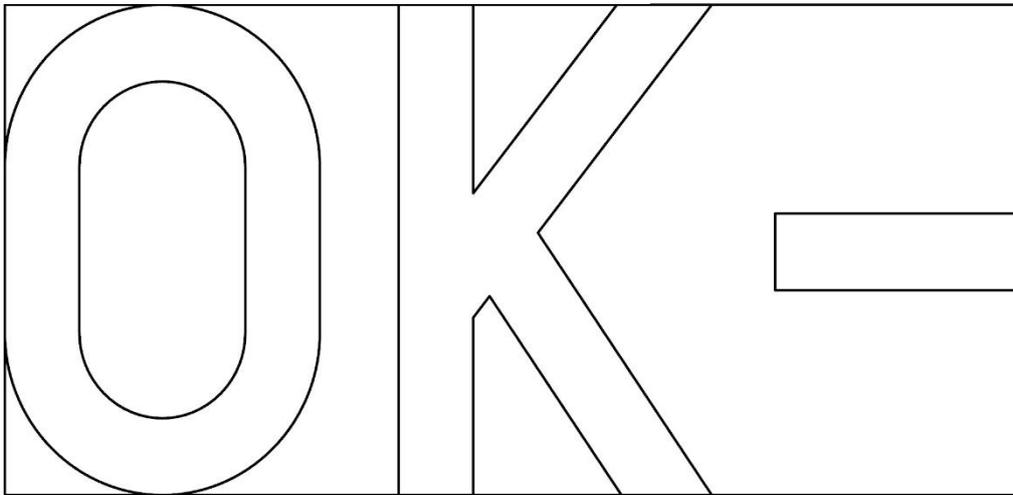
Wing spar position



Tail number for the fuselage - Print 1:1



Tail number for the wing - Print 1:1



Text for the vertical stabilizer - Print 1:1

Z-37 A