NANO

Small-DLG

Version 2 (3 servos)

Wingspan: 500mm
Weight: from 50g
Wing area: 4,5dm²
Controlled by:
elevator, ailerons, flaps

Airfoil on wing: AG11
Aifoil on elevator: HT 08
Airfoil on rudder: HT 08

Centre of gravity: 35mm from leading edge
Difference in angle of attack: ready milled, 1.3°

Electronic equipment:
3x Mamo M37 (www.mamo-modelltechnik.com)
1x Fullriver Lipoly 130mA/h (www.lindinger.at)
1x MZK Penta 5 or GWS R4 35H (www.lindinger.at)
Ropes for controlling elevator and aileron: dyneema, kevlar or dental floss

Cut all parts accordig to the templates and **sand** them with Mark Drela's method. (see more details in building instruction of MINI-Fireworks.)

As the rudder and the elevator are controlled with only one rope each, you must insert a **torsion spring** (0.3mm steel wire), which makes the control surface deflect in the opposite direction. (see pictures of MINI-Fireworks beside). Fix the control surface of the rudder with adhesive tape. Then, tip back the control surface of the rudder completely. Stick the spring into the balsa material and then harden the balsa with super glue. Mount the torsion spring of the elevator before gluing it to the fuselage.

Strengthen your Nano at least at following spots:
- carbon rovings 800tex (= half of the roving in the kit) around all power transmitting parts
- glass fibre 25g/m² or carbon rovings 800tex on the ailerons, where the lever is fixed and on the connection between wing and winglet
- leading edge of wing and rudder
Especially the fuselage should be strengthened sufficiently.

If you don't have any experience in working with resin or if you prefer an easier method, you can combine the **carbon rovings and glass fibre with super glue**: Put some drops of super glue on the rovings or the fibre, spread and press it with a (rustling) plastic bag. You will also save one or the other gram with this method. (see pictures beside)
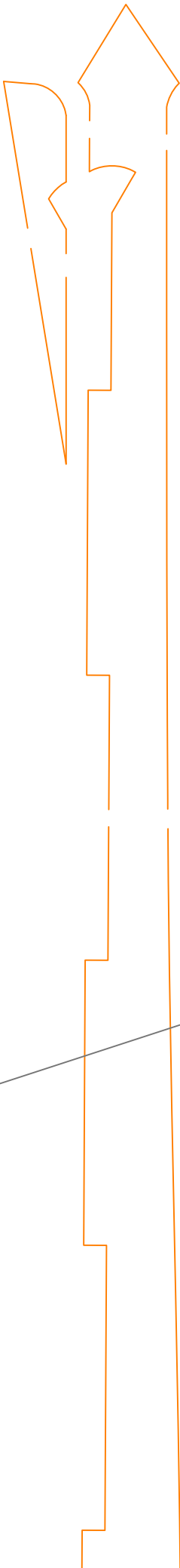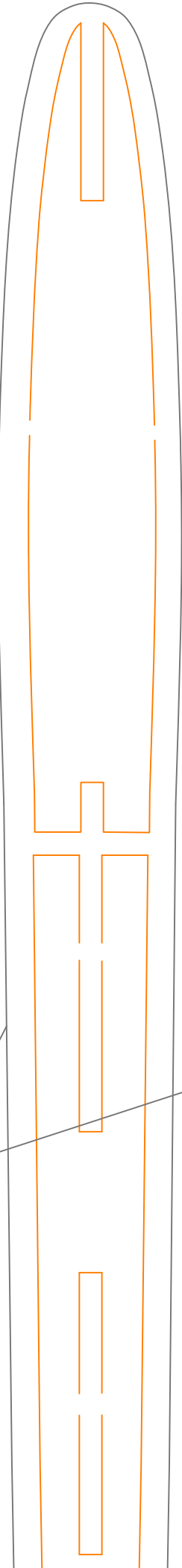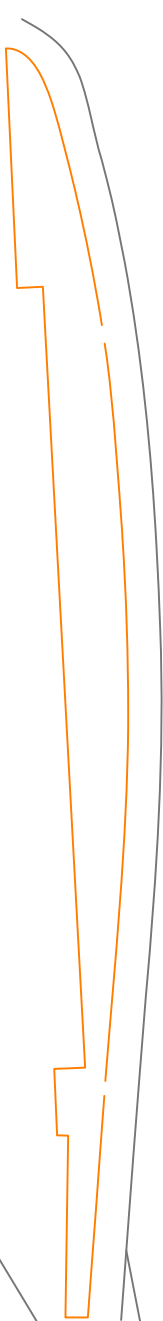
You should varnish all wooden parts with a special varnish to **fill the pores** and sand it afterwards. This will add some extra weight, but NANO will get a harder surface.
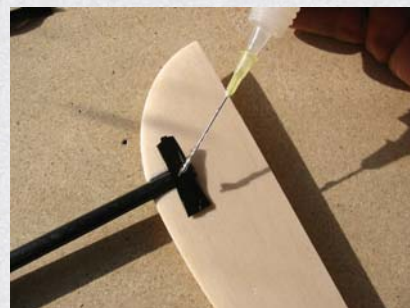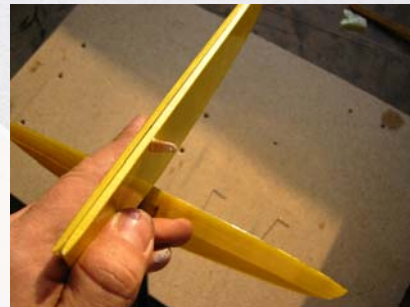
Fuselage + Stabilizer
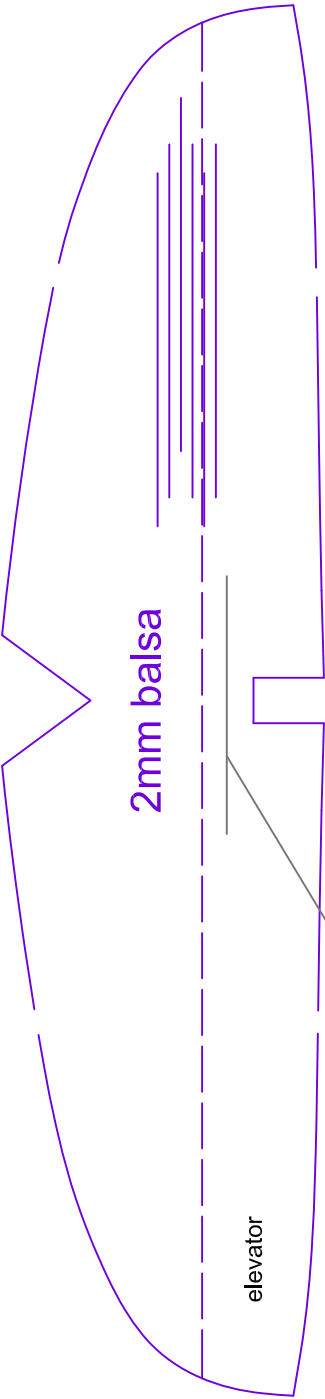
2mm balsa

elevator

4mm balsa

levers for elevator and aileron

1mm plywood

CFR-roving
800tex (1600/2)

Rudder

3mm balsa

2mm plywood

4mm balsa

CFR-roving
800tex (1600/2)

winglets
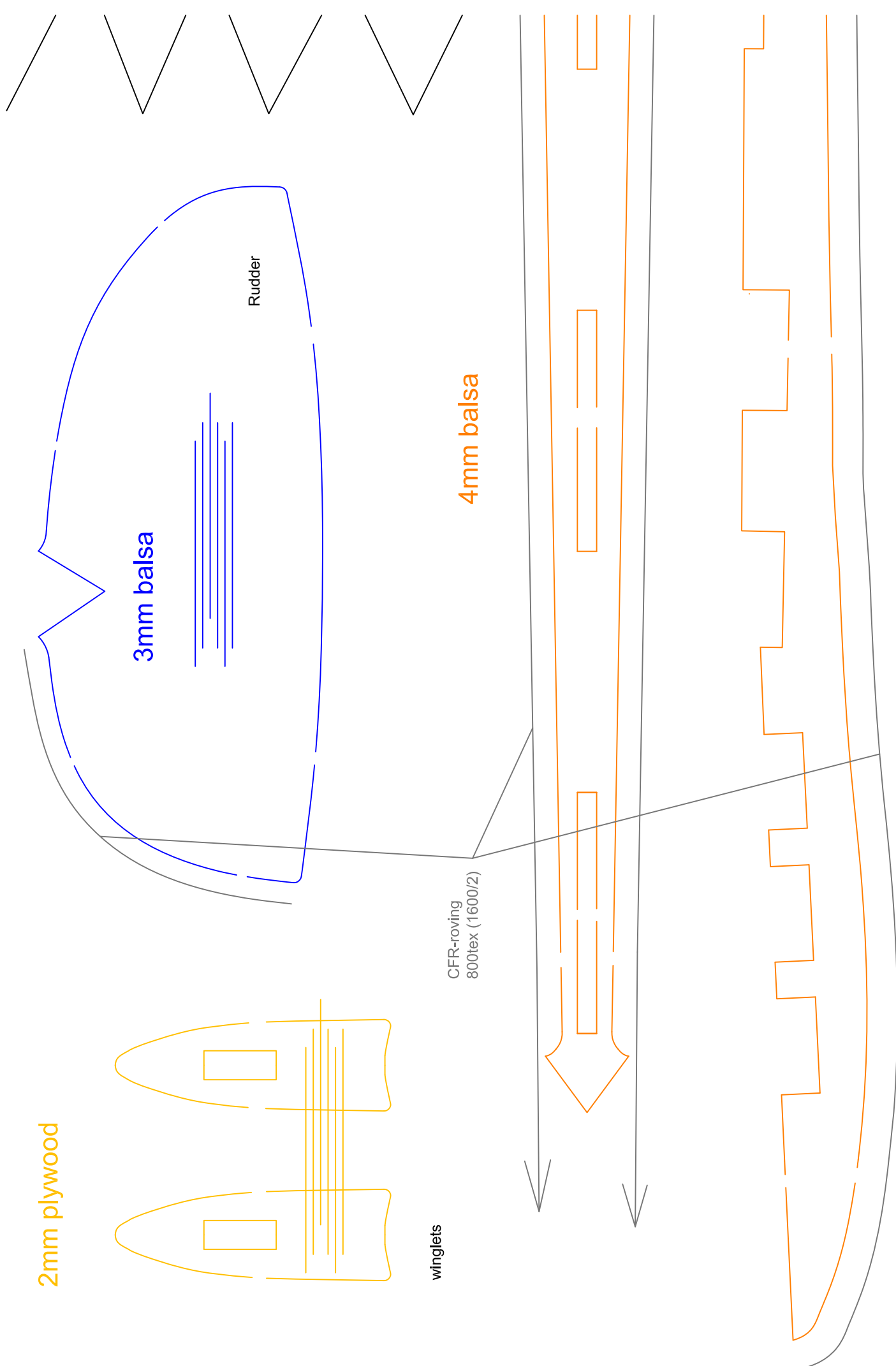
Wing

filling pieces

left wing

right wing

first sand the airfoil, then cut the aileron

6mm balsa

6mm balsa

CFK-roving
800tex (1600/2)
on leading edge

Sanding the airfoil onto the stabs

Make simple **grinding blocks** out of material that can be easily worked on.
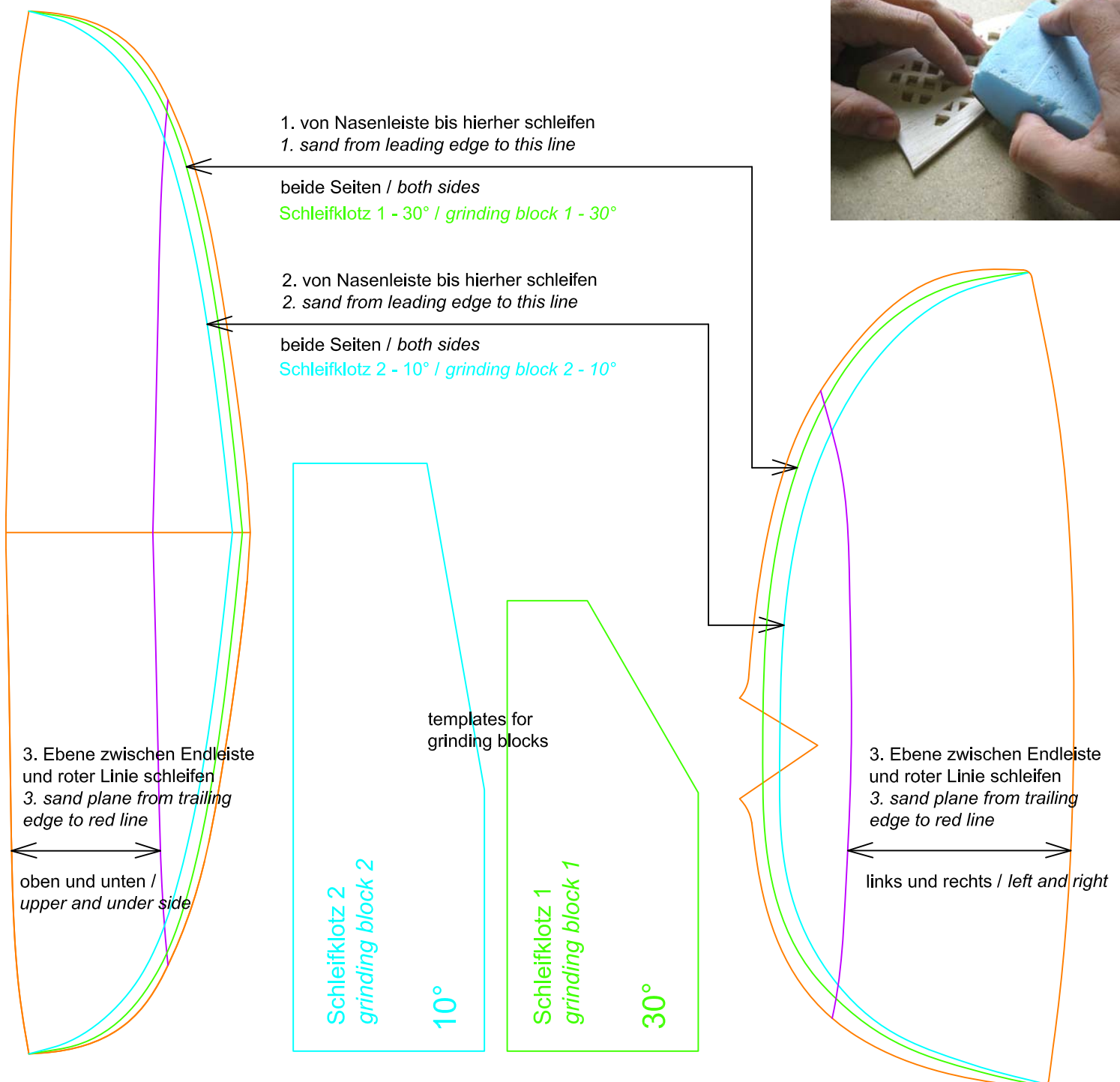
For example, you can cut out the drawings and glue them onto hard foam. Go over the outline with a hot wire or a sharp knife. Glue abrasive paper on the sloping surface.

Then, cut the drawings of the elevator and the rudder along the lines. You can use these templates for **transfering lines of same height** to the balsa boards.

Begin with the line near the leading edge and work step by step to the trailing edge (Here shown with elevator of Fireworks4). Mark each line on the upper- and the underside. Lay the sanding block on the table and then **sand along the line until you touch the line**. When you have sanded to the first line on both sides, go ahead with the next line.

The last line serves for sanding to the trailing edge. Mark the **midline** on the **trailing edge**. Sand with a normal grinding block until there is a **plane between the front line** and the **midline** on the trailing edge.

At last, **grind over the edges**, which have resulted from sanding, until there is a smooth airfoil.

1. von Nasenleiste bis hierher schleifen
1. sand from leading edge to this line

beide Seiten / *both sides*
Schleifklotz 1 - 30° / *grinding block 1 - 30°*

2. von Nasenleiste bis hierher schleifen
2. sand from leading edge to this line

beide Seiten / *both sides*
Schleifklotz 2 - 10° / *grinding block 2 - 10°*

templates for grinding blocks

3. Ebene zwischen Endleiste und roter Linie schleifen
3. sand plane from trailing edge to red line

oben und unten /
upper and under side

Schleifklotz 2
grinding block 2
10°

Schleifklotz 1
grinding block 1
30°

3. Ebene zwischen Endleiste und roter Linie schleifen
3. sand plane from trailing edge to red line

links und rechts / *left and right*

Sand and assemble wing

You can fit the 2 halves together with 0° V-form for easier sanding, but don't glue them in this position!

1. von Nasenleiste bis hierher schleifen
1. sand from leading edge to this line

nur Oberseite / *just upper side*
Schleifklotz 1 - 30° / *grinding block 1 - 30°*

2. von Nasenleiste bis hierher schleifen
2. sand from leading edge to this line
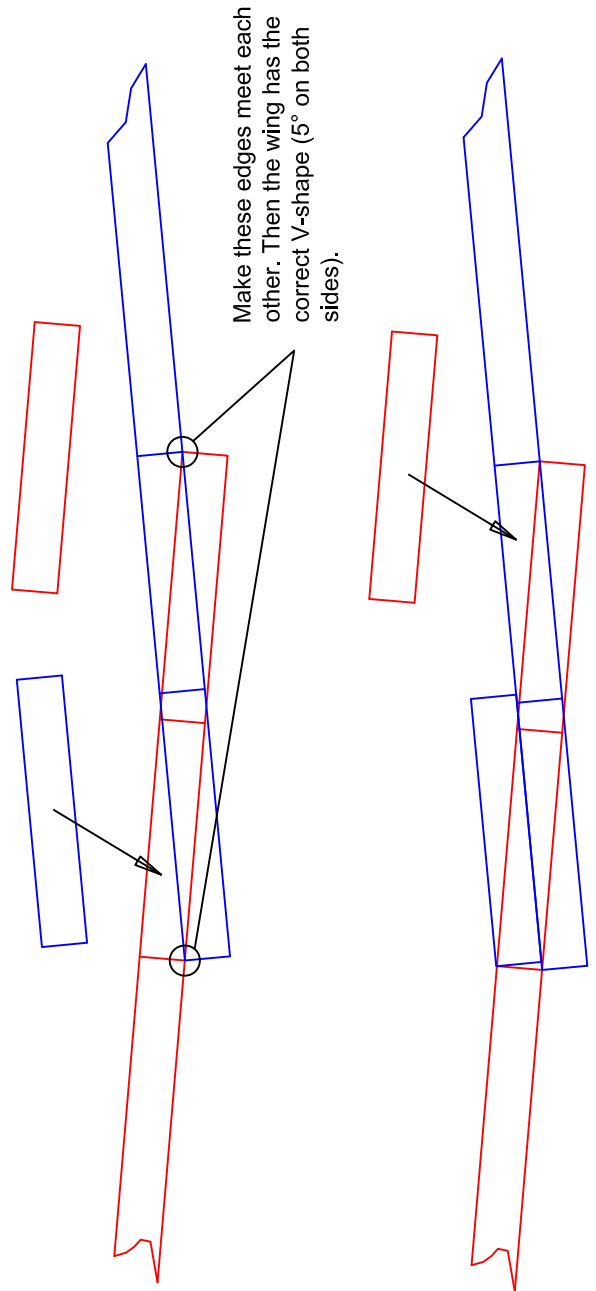
nur Oberseite / *just upper side*
Schleifklotz 2 - 10° / *grinding block 2 - 10°*

The trailing edge is the downside edge of the balsa block.

3. Ebene zwischen Endleiste und roter Linie schleifen
3. sand plane from trailing edge to red line

nur auf Oberseite schleifen
sand on upper side only

Make these edges meet each other. Then the wing has the correct V-shape (5° on both sides).

Grind down the jutting out balsa on the underside. Fill the resulting holes on the upper side with the filling pieces and grind them down as well.

Details

Installing the electronic equipment:

(Picture of version 1: Here 2 servos were mounted.)

Version 2:
3x M37
1x Lipoly 3,7V 130mA/h
1x MZK Penta without plug rail
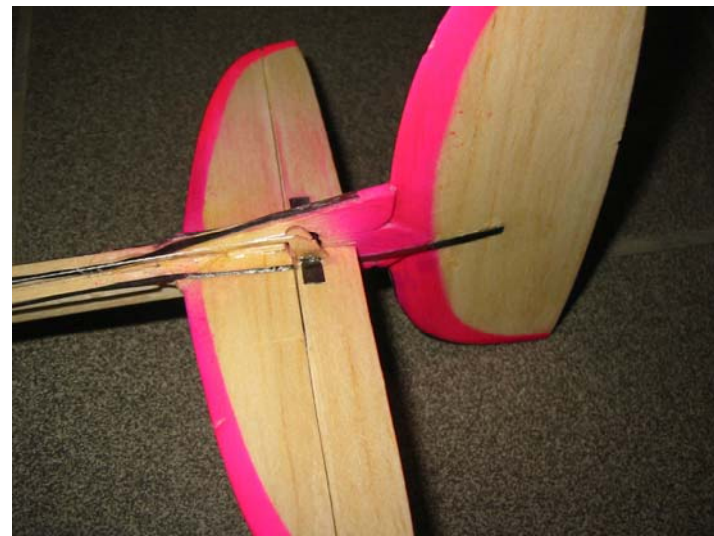

Detail aileron

As the rudder and the elevator are controlled with only one rope each, you must insert a torsion spring, which makes the control surface deflect in the opposite direction.

Detail stabilizer

Strengthen the connection point between rudder and fusleage with a triangular piece (strake).

CFR-roving for additional strengthening

View from above

You can easily trim the aileron, which is controlled by a thin rope, with a pin.