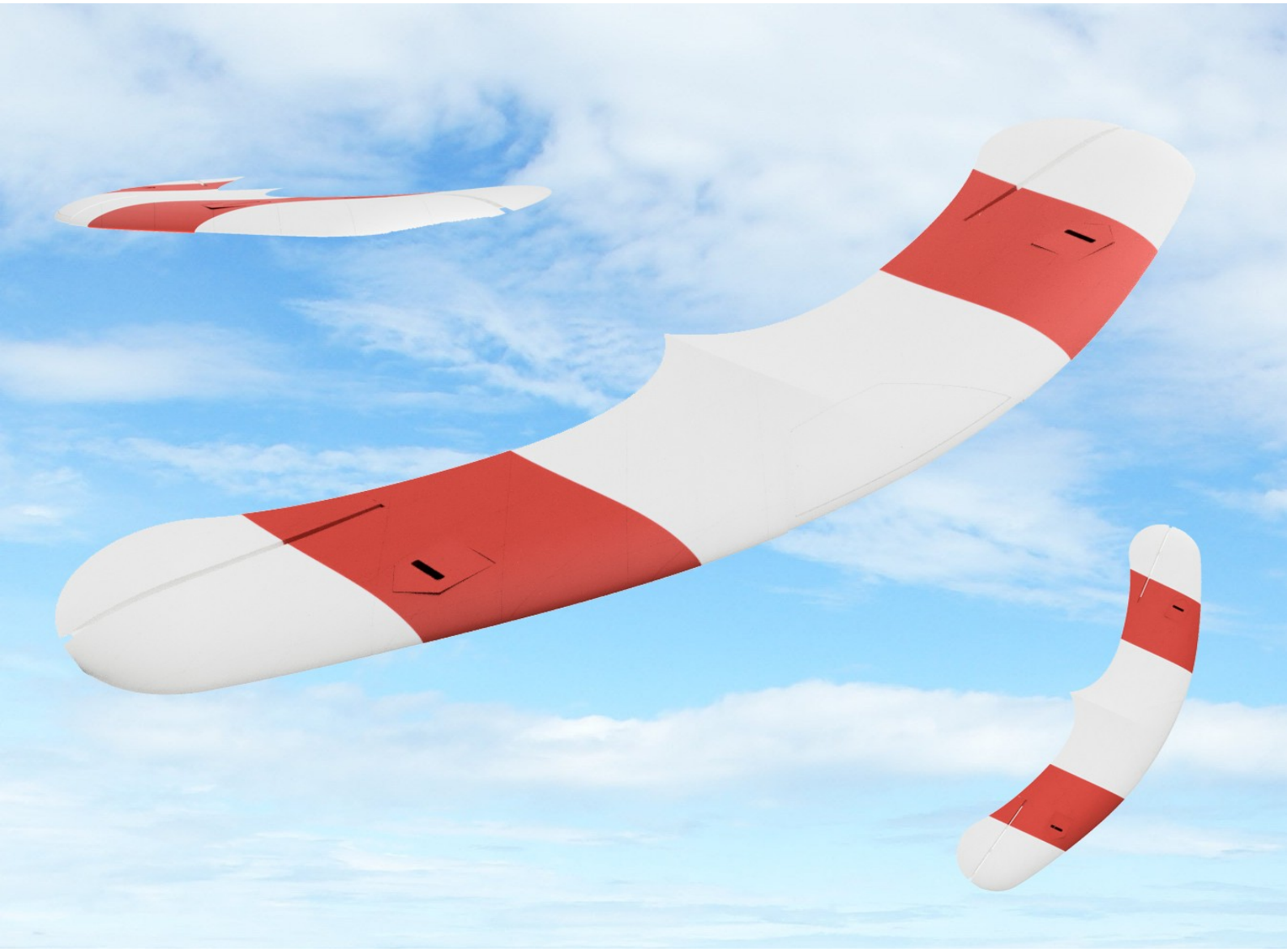
Zet-Zwo

3d-printz experimental



Span	1120 mm
AUW	400g
Airfoil	EMX-07
CG	90mm
Materials	LW-PLA, PLA

Learning from nature...

Many developments in aviation have been strongly inspired by natural forms – the use of winglets in commercial airplanes is a wonderful example of this.

One such natural inspiration is the seed of Alsomitra Macrocarpa – a gourd plant found in Thailand, Indonesia, and the Philippines.

Throughout the history of aviation, there have been numerous attempts to harness the shape and associated aerodynamic advantages of this seed.

The Zet-Zwo is an advancement of the Zanonia – one of our first 3D-printable model aircraft. In this design, we deliberately omitted stabilizers and instead focused on achieving stable flight behavior through geometric torsion, a corresponding lift distribution, and a modified airfoil.

The wing exhibits an exceptionally agile flight behavior and boasts a remarkably high roll rate. Of course, this design also comes with some peculiarities, such as yawing in certain flight situations (especially during abrupt control inputs at low speeds).

For us, it is precisely these idiosyncrasies that make the Zet-Zwo a welcome deviation from the mainstream in the RC flight model construction field.

Materials

1000x6mm Carbontube	1 pcs
servoscrews	15 pcs
LW-PLA	ca. 200g
regular PLA	ca. 100g
Servos 9g – SG90 or similar	3 pcs
RX of your choice	1 pcs
Battery fe 4 Cell NimH	1 pcs
servopushrods	50cm insgesamt
CA and Accelerator	

Printsettings

The following settings are recommendations. Your individual, perfect settings will heavily depend on the material used, your 3D printer, ambient temperature, humidity, etc. Please consider them as guidelines and feel free to experiment. The default settings were created using a Prusa i3 MK3S with a 0.4mm nozzle.

Category		A	B
Material		LW-PLA	PLA
Layerhöhe (mm)		0,25	0,2
Bodenschichten		2	2
Deckschichten		3	3
Aussenwände		1	2
Infill		0%	10,00%
Nozzletemp		235°C	215°C
Bedtemp		60°C	60°C
Flow (%)		52,00%	100,00%
Cooling		50,00%	50,00%
Brim		yes	yes
Support		none	none
Linewidth		0,42	0,42

If you want to increase the strength or reduce the weight of a part, feel free to experiment with the number of outer walls, infill, and line width!

Printsettings

After defining the profiles in your slicer, you can start slicing the parts. We recommend printing the LW-PLA parts individually, especially if you are using active foaming LW-PLA.

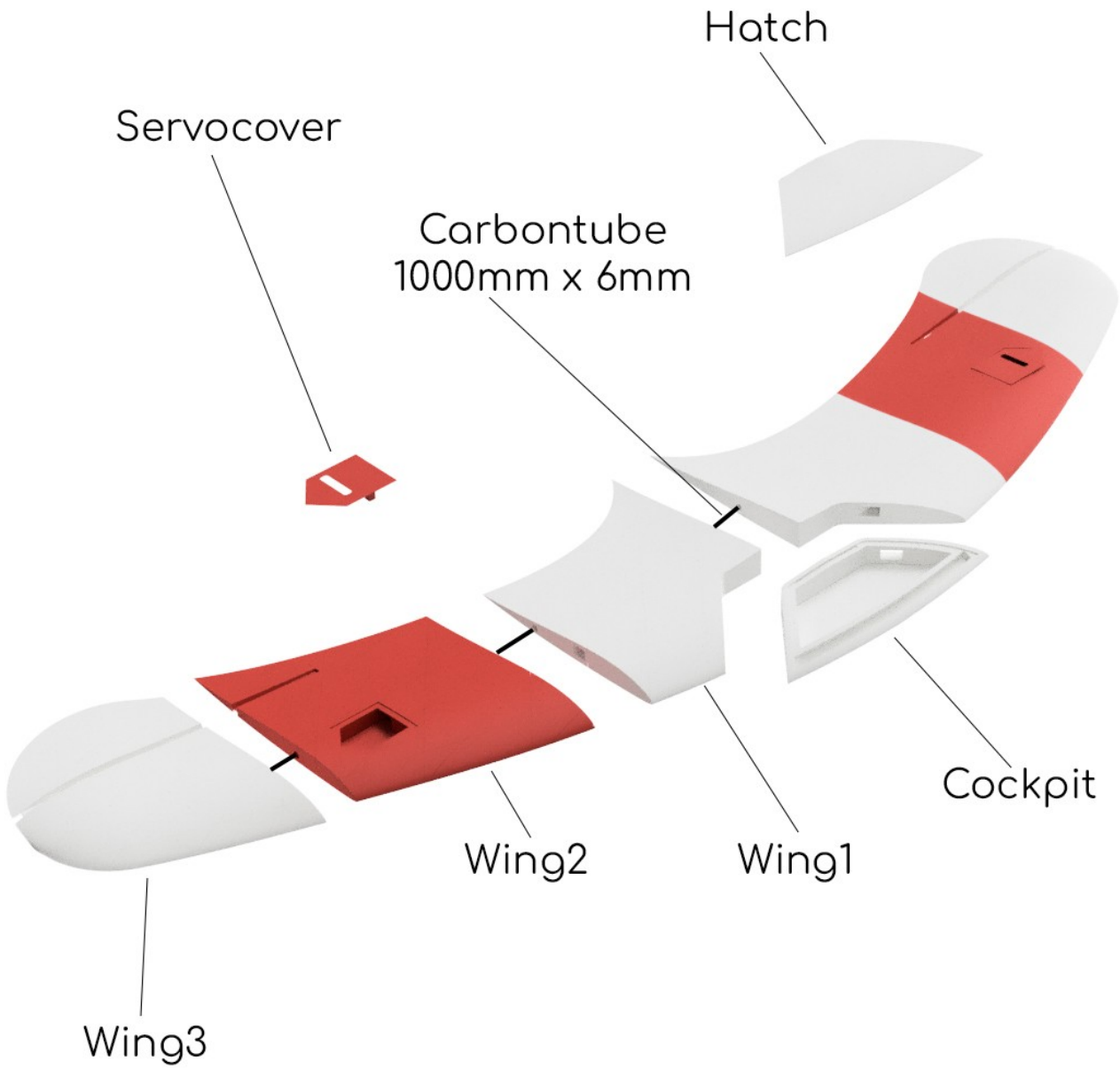
Part	Category	additional Settings
Wings	A	
Cockpit/Hatch/Servocover	B	

The STL files are prealigned, allowing them to be printed perfectly without the need for support structures!

*For the best results, consider adding a "heightrangemodifier" to avoid printing some lines in mid-air. The prints can still turn out fine without modifiers, but if you're as meticulous as I am, you'll use them ;)

Don't forget about the additional settings for some parts! If you feel the need to reinforce certain areas, feel free to use some "meshmodifiers" or individual processes. Our test aircraft were printed using the settings mentioned above without any additional reinforcement.

Explosionview



Assembly

Since the Zet-Zwo consists of only 10 parts in total, the assembly can be completed in just a few minutes:

1. Prepare the parts - remove brims, do some sanding if necessary.
2. Check the fit of the cutouts, especially the spar guides.
3. Cut the ailerons free from the Wing2 parts using a utility knife.
4. Join all wing parts flush together using cyanoacrylate glue and let them dry. Use the spar as a guiding rail during this process.
5. Glue the cockpit in place.
6. Thread the servo cables, burn screw holes into the servo covers using a hot wire, and secure the servos with screws. Create screw holes for the "Hatch."
7. Install the RC system, glue the control horns, and connect the control surfaces.

Schwerpunkt, Ausschläge, Erstflug

Center of Gravity (CG)

For Planks, the center of gravity (CG) is an extremely important value, and it is essential to set it accurately. During testing, we determined a value of 90-92 mm behind the leading edge. It is advisable to have the CG more towards the front end of the spectrum for the very first flight and then adjust it accordingly to suit your needs.

Throws

With a center of gravity at 92mm behind the leading edge (measured at the wing's root), the control surfaces should be in a neutral position. At 90mm CG, they should be at approximately 1-1.5mm in the upward direction.

Aileron: +20mm / -18mm

Elevator: +16mm / -14mm

Maiden

Once the center of gravity is set, and the control surface deflections are adjusted correctly, you can confidently launch the Zet-Zwo into its element with a good toss. Due to its unique shape, the throwing technique for this model is somewhat special. We have found that the most effective grip is to hold the nose with the throwing hand, with the back of the hand facing the launching direction. This throwing technique may feel peculiar at first, but it ensures smooth launches and prevents an excessively steep pitch angle during the launch.