SAAB
J29 TUNNAN

MANUAL

ABOUT THE J29 TUNNAN

The Saab 29 Tunnan, colloquially Flygande tunnan or just Tunnan (English: "The flying barrel", "The barrel"), is a Swedish fighter that was designed and manufactured by Saab in the late 1940s. It was the second turbo-jet-powered combat aircraft to be developed in Sweden, the first being the Saab 21R, and it was the first Western European fighter to be produced with a swept wing post World War II, only being preceded in Western Europe as a whole by the Me 262 built during the war. Despite its rotund appearance, from which its name is derived, the J 29 was fast and agile and served effectively in both fighter and fighter-bomber roles into the 1970s.

Role	Fighter
National origin	Sweden
Manufacturer	Saab
First flight	1 September 1948
Introduction	1951
Retired	1976
Primary users	Swedish Air Force
	Austrian Air Force
Produced	1948–1956
Number built	661

DESIGN

The Saab 29 Tunnan was the first Swedish aircraft to be specifically designed to use jet propulsion. Sweden's first jet fighter, the Saab 21R, had been modified from the piston-engined Saab 21. It is a small, chubby aircraft with a single round air intake in the nose, with the pilot under a bubble canopy directly above the air intake duct on the upper-forward section of the fuselage. It has a very thin mid-mounted moderately swept two-spar wing which is a single structure attached to the fuselage by four bolts. The undercarriage is hydraulically operated, and was designed to be suitable for use from rough airstrips. To improve pilot survivability, the Tunnan used an ejection seat Saab developed in 1943, with an explosive jettisoning system for the canopy.

The Tunnan is powered with a single 5,000 lb (2,300 kg) de Havilland Ghost turbojet which have a top speed in excess of 650 mph (1,050 km/h), better performance than Sweden's de Havilland Vampires. The engine was bolted to the fuselage at three points and a special trolley was used to remove the engine for maintenance. The final version had an afterburner, the first successful one used with a British jet engine.

Improvements were made to the wing to incorporate a dog-tooth leading edge, raising the critical Mach number. From 1963 onwards, all frontline J 29Fs were equipped with AIM-9 Sidewinder infrared-seeking air-to-air missiles.

UN J 29 fighters in the Congo

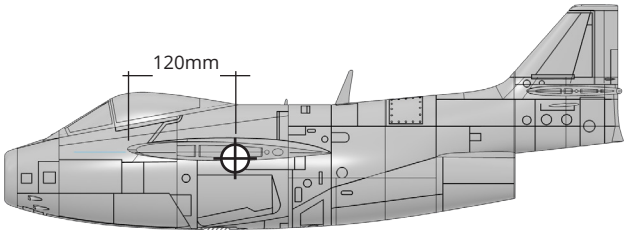
Text from Wikipedia:
https://en.wikipedia.org/wiki/Saab_29_Tunnan

ABOUT THE MODEL

Wingspan	800mm
Take off weight	≈800g
Motor	FMS 50mm EDF 4s
Battery	4s 1500mAh
Wing loading	≈75g/dm²

This model is designed for printing with LW-PLA from Colorfabb. The parts is made with spiral printing in mind as far as possible. There is a few parts that is made with a single wall and infill instead.

I've tried to keep it as scale as possible to make a good looking and convincing model. And if you like to sand and paint, this model will be a good canvas to make a stunning looking model.



CENTER OF GRAVITY

The CG is pretty much in the middle of the wing cord at the root. I have the CG set to 120mm from the leading edge at the wing root. Se image above.

MY PAINTING PROCESS

I find it more easy to paint and detail everything bebore i assemble the whole plane. So I glue the wings and paint them. And the fuselage as one part and so on. After all is painted I glue them all together.

First off is sanding the surface with a quite coarse paper (about 260 grit). This will take away most of the layer lines. Then I spray it with the spray putty. Now take a 600 grit wet paper and wet sand it until almost all the putty is gone. You will now have a very smooth surface.

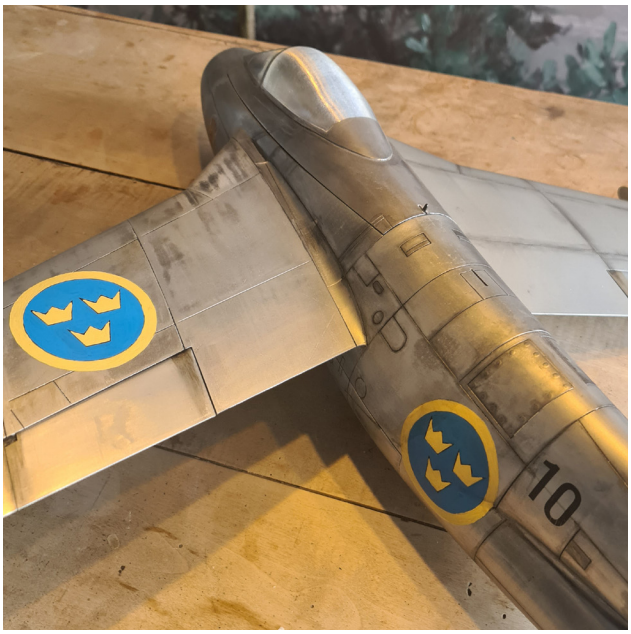
Spray it once again with spray putty and wet sand it with a 1200 grit paper. Sand it until there is almost no putty left. Now the layer lines is gone and the surface is super smooth.

Now it's time to paint the base coat of aluminium. The AK true metal is a wax paint that is smeared out with the finger. You don't need much. After it's dry you can buff it up with your finger or with a cloth. It will become very shiny and metal looking. After this you need to seal it. I used a satin clear cote in a spray bottle.

Decal time... and of you want, wheathering. I made the decals with a incjet water sliding decal sheet. The only problem is that it's on a clear base, so the background color will show through. So I touched up the markings with yellow and blue acrylic color.

For wheathering and panel lines I used oil colors for plastic models.

One more cote of satin clear cote so seal it all and you are ready to glue the pieces together.



Spray putty. Effective to get rid of those layer lines. It will give you a bit of extra weight but you'll sand away almost all of it.

I've been looking a long time to get a natural aluminium finish. Spay paints just don't look like real metal. This wax-paint from AK is actually very good.

The nose part after painting with AK True metal.

PRINTER SETTINGS

Printer setting	A	B	C	D	E
Material	LW-PLA	LW-PLA	LW-PLA	Clear PLA or PETG	PLA
Quality					
Layer height	0,2mm	0,2mm	0,2mm	0,2mm	0,2mm
Line width	0,4mm	0,4mm	0,4mm	0,4mm	0,4mm
Walls					
Perimeters	1	1	1	1	2
Vase/spiral-mode	Yes	No	No	Yes	No
Top/bottom					
Top layers	0	0	2	0	3
Bottom layers	7	7	7	1	3
Infill					
Infill density	0	0	6%	0	15%
Infill pattern	—	—	Gyroid	—	Gyroid
Supports	No	No	No	No	No
Retract distance	0,5mm	0,5mm	0,5mm	No change	No change

COLORFABB'S LW-PLA

The use of LW-PLA has really been a game-changer for 3d-printed airplanes. Half the weight and nicer surface finish.
The only con is that it's oozing a lot.
To overcome this you can design the parts for printing with as few retractions as possible. That is what I've tried to do with this J29 Tunnan.

Speed
With LW-PLA you have to drop the speed quite drastically. Colorfabb recommends 40-100mm/s but I found that 25mm/s makes much more clean and accurate parts.

Temperature and Extrusion multiplier
In my settings I use 250° and 0.45 for Extrusion multiplier. To get it right for your machine I strongly recommend that you do a test cube and try different temperatures and multiplier settings till you get a wall thickness of 0.4mm.

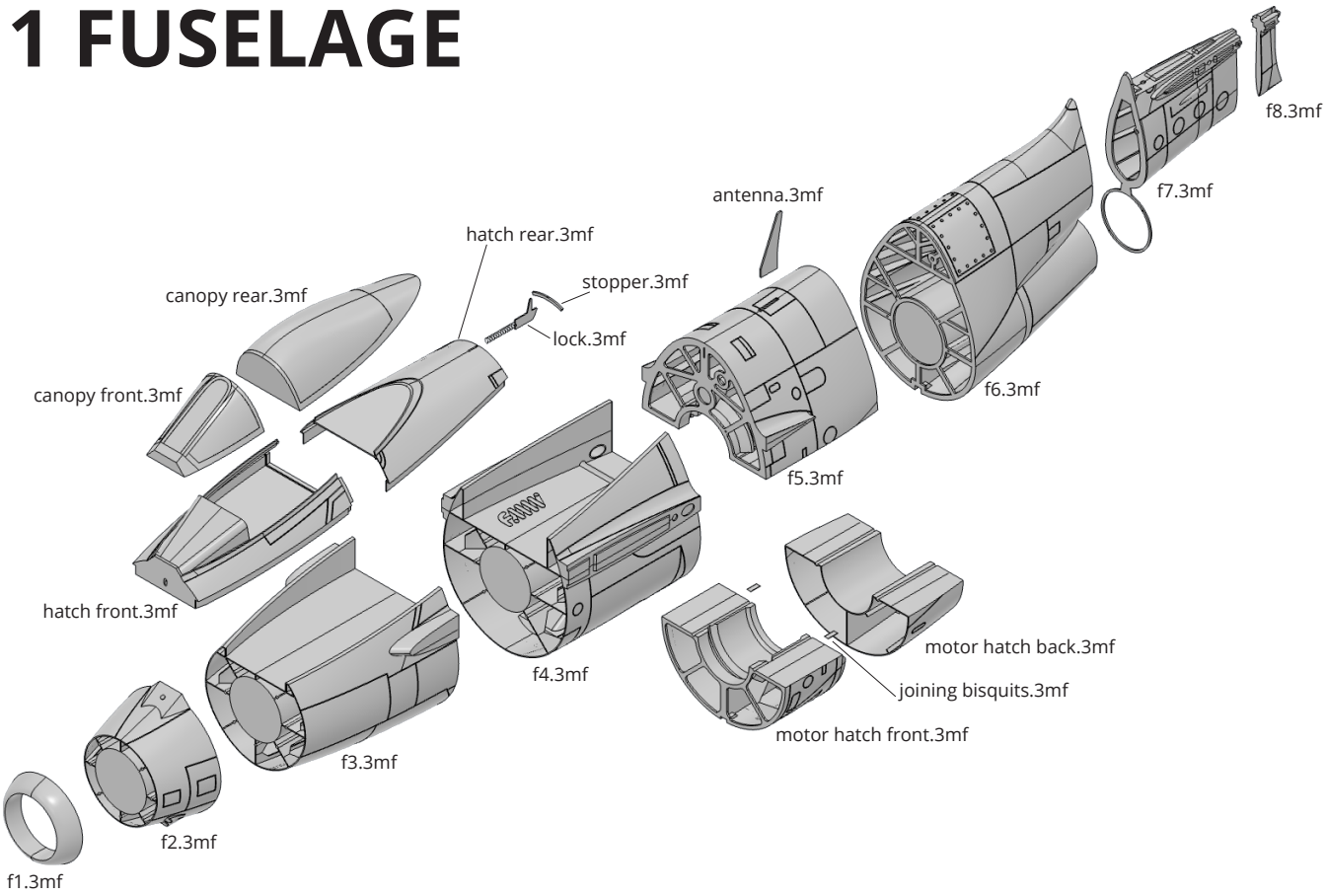
Retraction
I dropped the retraction to 0.5mm. If you have the same settings as ordinary PLA the nozzle will clog eventually.

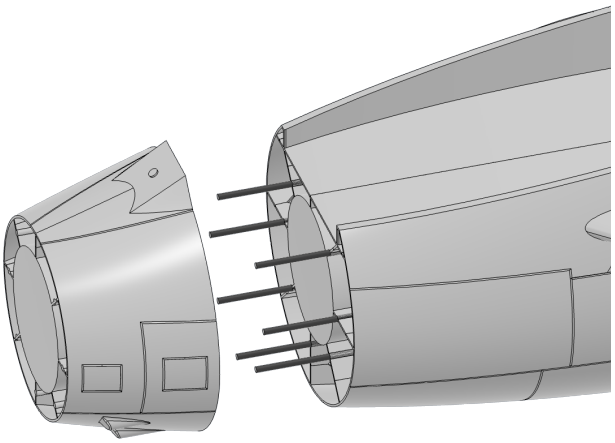
Slicer
I strongly recommend you to use Prusa slicer. Get it here for free. All thin wall parts is designed for Prusa slicer in mind.

CHANGELOG

Version 1.1 - June 2023 **Changed files in V1.1**	**Reason for change:**
w3 left and right wing	Issues in slicer with sertain settings. Works fine now with Spiral mode.
Motor hatch front	Removed the aligment slots to make it possible to print in spiral mode for a better print quality.
Joining bisquits	Print 6-8 joining bisquits to helt aligning the motor hatch parts together.

1 FUSELAGE

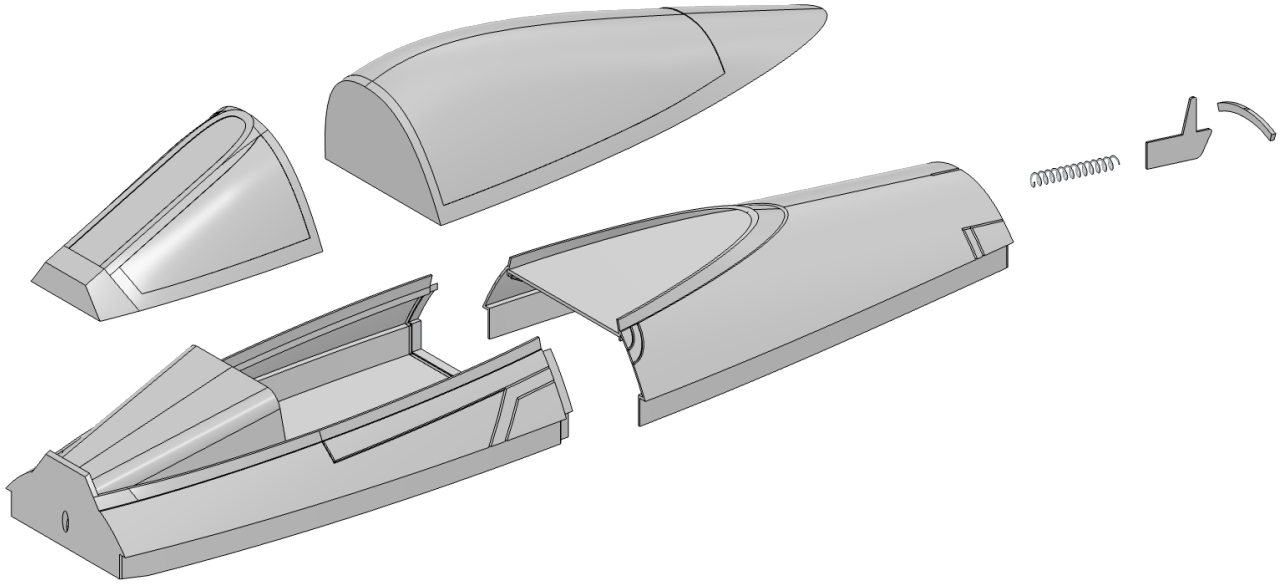




ASSEMBLING THE FUSELAGE

Start by cleaning all the parts from oozing.
Cut 1mm carbon rods to about 3cm length to act as positioning tools.
Glue the pieces together with CA glue.
F7 and F8 is butt joint without carbon rods. Keep calm and just work slowly. I used masking tape to hold the parts together and used thin CA. Remove the tape and put glue on the whole joint.

Part	Material	Printer setting
f1	LW-PLA	C
f2	LW-PLA	A
f3	LW-PLA	A
f4	LW-PLA	A
f5	LW-PLA	A
f6	LW-PLA	A
f7	LW-PLA	A
f8	LW-PLA	C
hatch front	LW-PLA	A
hatch rear	LW-PLA	A
canopy front	Clear PLA or PETG	D
canopy reat	Clear PLA or PETG	D
Lock	PLA	E
Stopper	PLA	E
Antenna	PLA	E
motor hatch front	LW-PLA	A
motor hatch back	LW-PLA	A
joining bisquits	LW-PLA	B



HATCH

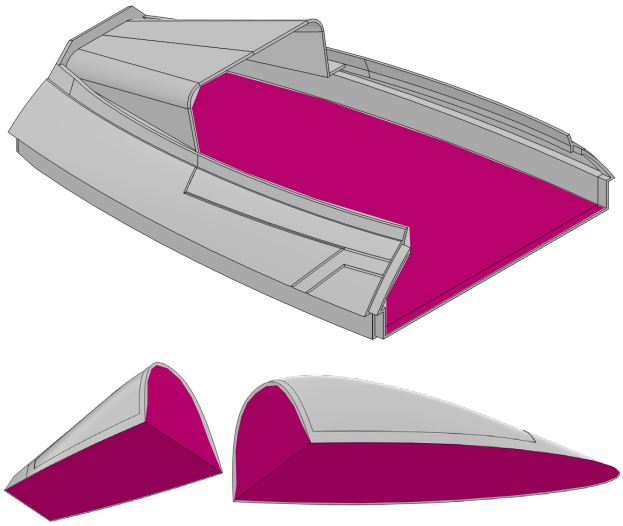
Start by cleaning the parts. Then cut away the floor in the front part of the hatch. See image below.

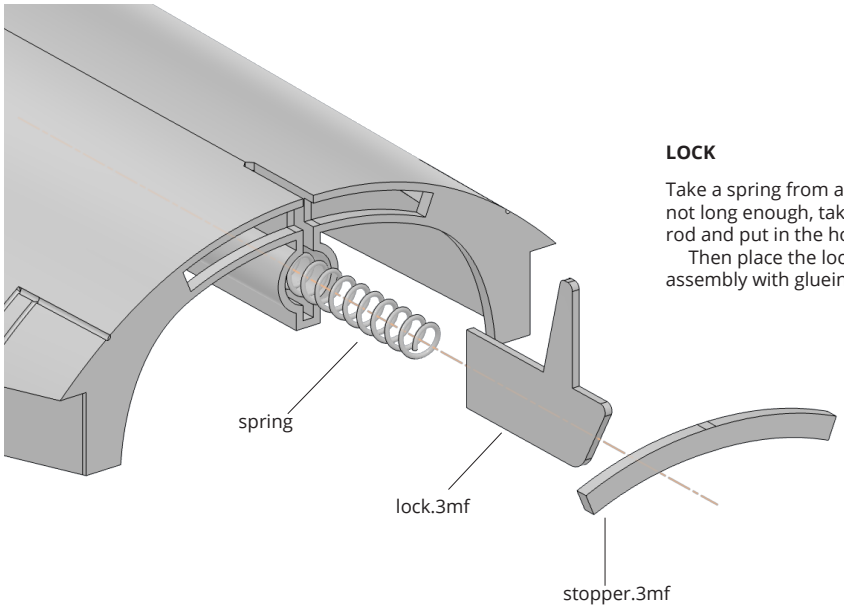
Glue the parts hatch-front and hatch-rear together.

CANOPY

Cut away the bottom and the sides of the canopy. See image below. leave about 1mm frame around the edges where the canopy is glued together. Sand the cut so it will be a tight fit to the hatch.

Glue the canopy parts together and then glue it to the hatch.

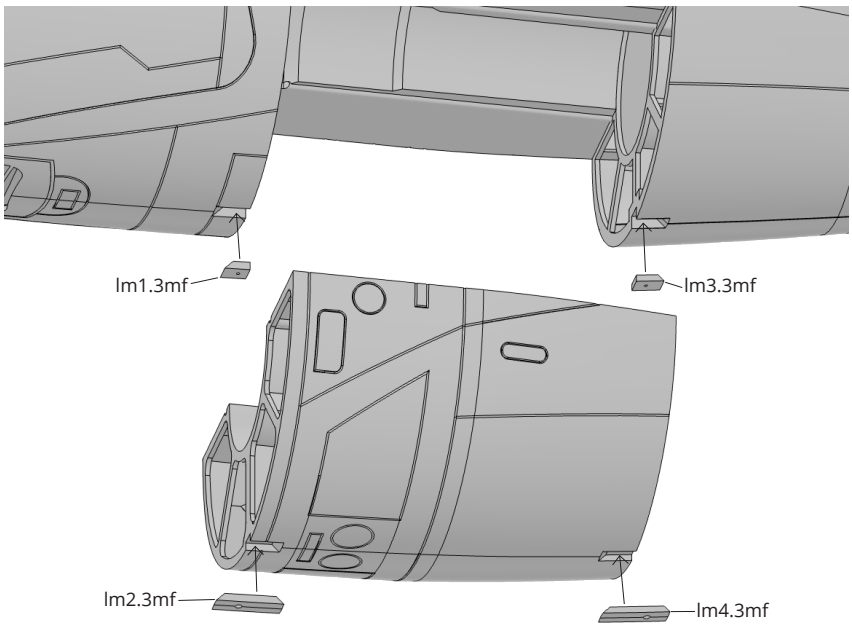




LOCK

Take a spring from a ball pen. If the spring is not long enough, take a small piece of carbon rod and put in the hole in the hatch-rear first.

Then place the lock in place and secure the assembly with glueing the spopper in place.



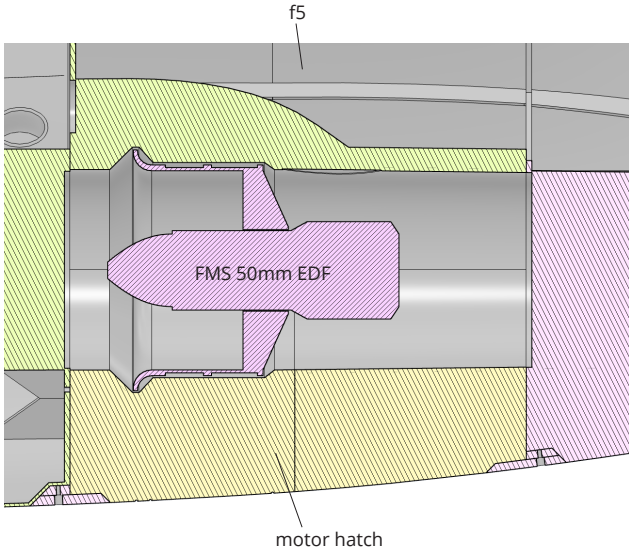
MOTOR HATCH

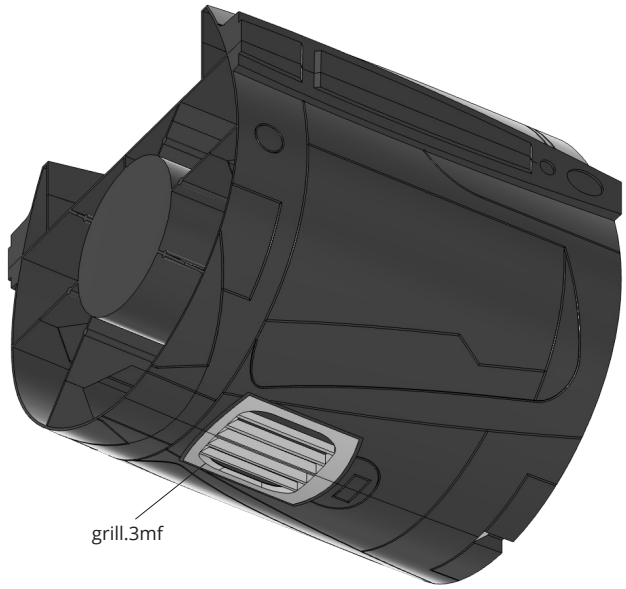
Start by glueing the motor hatch together with the help of the joining bisquits. The motor hatch is hold in place by 2 small screws. Glue the small parts (lm1, lm3) to the fuselage. Drill out the holes to fit your screws. The screws threads must bite but it should also not be to hard to screw it in.
Glue lm2 and lm4 to the motor hatch. Drill out the holes with a larger drillbit so that the screw slides through.

Part	Material	Printer setting
lm1	PLA	E
lm2	PLA	E
lm3	PLA	E
lm4	PLA	E

MOTOR MOUNT

The motor is held in place by being inserted in the slot in the motor hatch and f5.
Put the electric wires into the hole in f5.

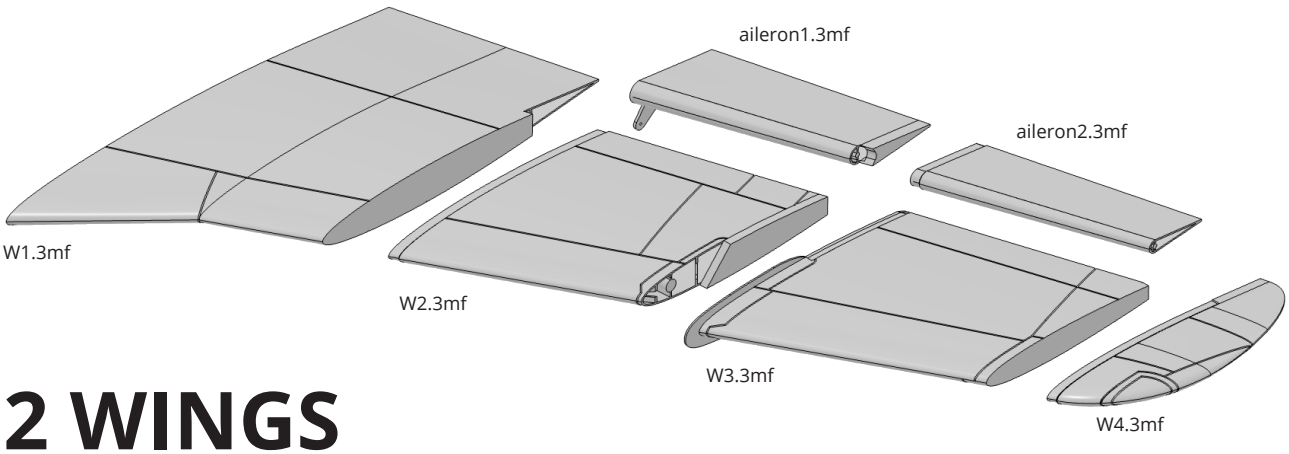




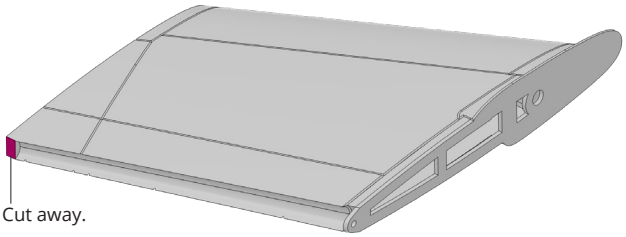
INLET GRILL

I made the grill from ordinary PLA.
Just sand it and glue it in place.

Part	Material	Printer setting
grill	PLA	E



2 WINGS



Part	Material	Printer setting
W1	LW-PLA	A
W2	LW-PLA	A
W3	LW-PLA	A
W4	LW-PLA	C
aileron1	LW-PLA	A
aileron2	LW-PLA	A
wing servo cover	PLA	E

Start with cleaning the parts. Get rid of all the oozed plastic at the foot of the print. Cut away the little parts at the end of the overlapping areas (see image).

Glue together W1, W2 and W3. Use the 5mm carbon rod to align the pieces. Make sure that the rod doesn't get glued.

Glue the aileron1 and aileron2. Use the 1mm carbon rod to align. Same here... make sure that the rod doesn't get glued.

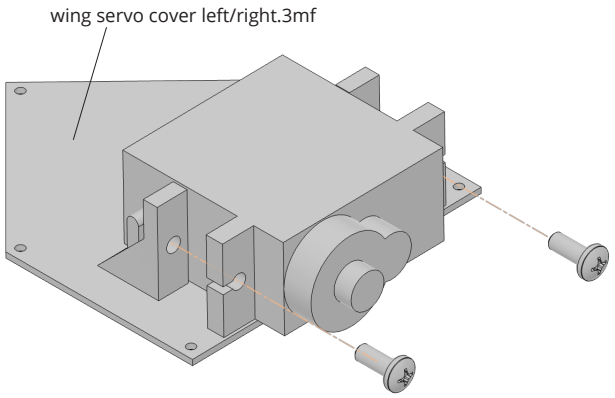
Align the aileron to the wing and push the 1mm carbon rod through the hole in the aileron and in the hinge in the wing, all the way into the hole in W1.

Glue W4 in place, aligning the carbon rod in the hole in W4. Make sure that you don't glue the aileron to W4.

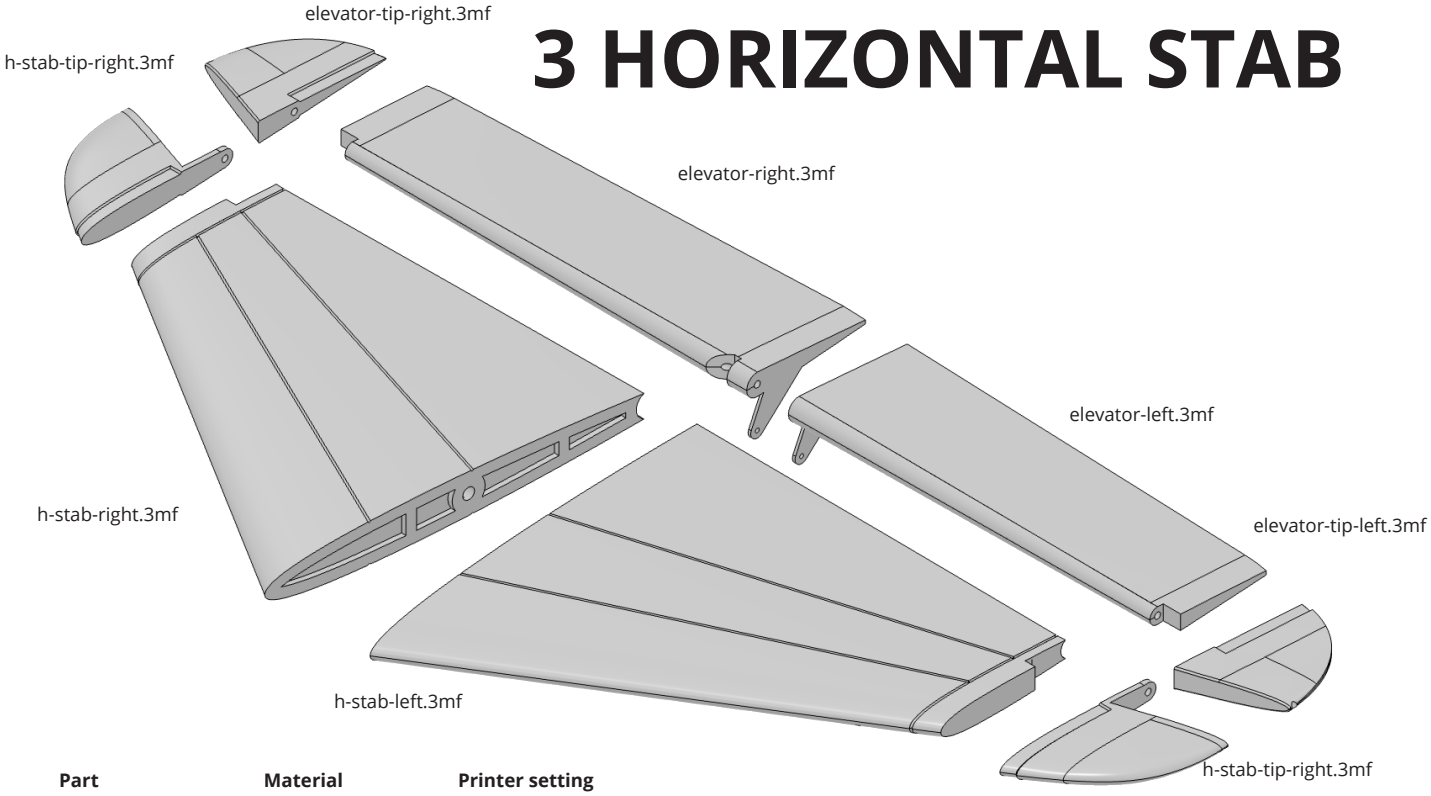
Glue the wing to the fuselage with the 5mm carbon spar.

CONNECTING THE SERVO

Screw the servo to the servo cover.
Put the wires in the channel in the wing.
Screw the servo cover to the wing.



3 HORIZONTAL STAB



Part	Material	Printer setting
h-stab-left	LW-PLA	A
h-stab-right	LW-PLA	A
h-stab-tip-left	LW-PLA	C
h-stab-tip-right	LW-PLA	C
elevator-left	LW-PLA	A
elevator-right	LW-PLA	A
elevator-tip-left	LW-PLA	C
elevator-tip-right	LW-PLA	C

As always... Clean the the parts. As with the wing you'll ned to cutaway a small piece where the parts overlap before glueing. Dry fit the parts and trim til you have a snug fit before you glue.
Glue the elevator together. Use the carbon rod as a guide tool.
Next, glue the horisontal stab pieces together and glue them to the fuselage with the 3mm carbon rod.

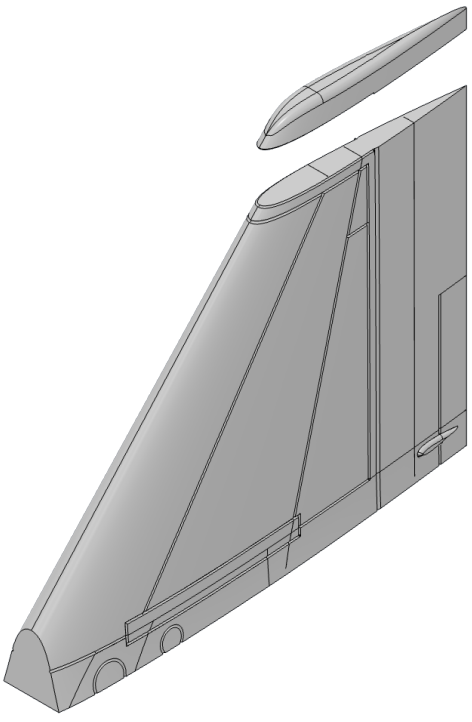
The elevator is hinged with a carbon rod so the installing is super simple. First attach a pushrod (1,2mm pianowire) and slide it through the fuselage through the guide holes. Then place the elevator in place and slide the carbon rod in place.

And that's all.

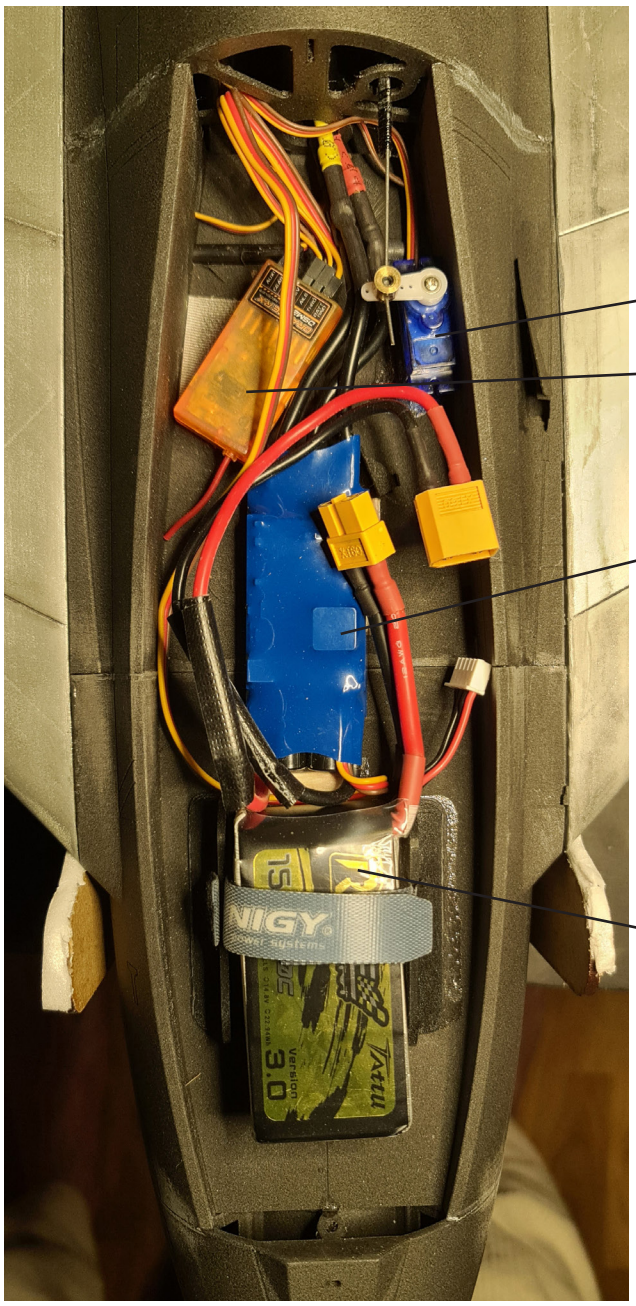
4 VERTICAL STAB

Part	Material	Printer setting
v-stab	LW-PLA	A
v-stab-top	LW-PLA	C

Clean the the parts.
Glue the parts together and glue the vertical stab to the fuselage with the 3mm carbon rod.
And done.



5 ELECTRONICS



Glue the elevator servo to the wall and floor of the hatch.
I used velcro to secure the receiver and ESC.
After you wheigh in the battery to find the CG, glue the battery holders in place and use a velcro strap to hold the battery in place.

6 THROW

Recommended throw for ailerons and elevator.
I use 30% expo.

Control surface	Up	Down
Aileron	8mm	4mm
Elevator	11mm	11mm

7 TROLLEY

Cut the DXF tiles in 3mm plywood or hardboard.
Glue them together like on the photo.
Print 4 wheelhubs and 4 tyres and mount them on the trolley with m5 bolts and nuts. Make sure the wheels spin freely and don't forget to secure the nuts.
I glued a strip of depron on the top of the trolley to protect the wing.

Happy flying!

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