3D LabPrint

# User Guide

rev. 2025/09

Fully 3d printable

## Nakajima Ki-43 Hayabusa

scale 1:12, wingspan 950 mm / 37.4 inch

LW planes

# Nakajima Ki-43 Hayabusa
## fully printable R/C plane for your desktop 3Dprinter

Fully 3D printable RC model of the classic plane, specially designed as a cheap and easy to build Stable RC model for everyday flying. Many scale details such as airframe plating encourages to create realistic paint jobs. This plane has been designed for printing from PolyLight 1.0 LW-PLA active foaming filament, that allow even the small printed planes to be as light as any other RC plane building technique. Get ready for flying with this great performing flying legend!

**The fully printable** airplane files prepared for your 3Dprinter, with flight characteristics, comparable or even supperior to classic build model airplane.
This is not a dream, now you can print this HI-TECH at home. Simply download and print the whole plane or spare parts anytime you need.

**Extensive hi-tech 3d structural reinforcement** making the model very rigid while maintaining a lightweight airframe and exact airfoil even it's just a plastic. This perfect and exact 3d structure is possible only thanks to additive 3dprinting technology. So welcome to the 21st century of model flying and be the first at your airfield.

**Easy to assembly,** you don't need any extra tools or hardware, just glue printed parts together and make pushrods for control surfaces. The rest of the assembly is very easy. Simply add brushless motor, ESC, servos and radio system. Don't worry, detailed step by step PDF/VIDEO is included. You'll get a superb performing airplane with highly efficient powerplant capable of flying 8+ minutes at full throttle and speeds exceeding 80 kph. Low stall speed is achieved for easy landing on the other hand.

## General specifications:

| | |
|---|---|
| Wingspan: | 950 mm / 37.4 inch |
| Lenght: | 735 mm / 28.9 inch |
| Height: | 185 mm / 7.1 inch |
| Wing area: | 16,6 $dm^2$ / 1.79 $ft^2$ / 257 $in^2$ |
| Wing loading: | 34.7 g/dm2 / 11.41 oz/square feet |
| Center of gravity: | 45 mm / 1.8 inch from leading edge |
| Airfoil: | LHK508 modified by 3DLabPrint |
| Print weight (LW PLA): | 248 g / 8.8 oz |
| Empty weight (w/o battery): | 400 g / 14.1 oz |
| Takeoff weight (4s 1500 lipol): | 500 g / 17.6 oz |
| Max takeoff weight: | 600 g / 21.1 oz |
| Never exceed speed, VNE: | 160 km/h / 99 mph |
| Design maneuvering speed, VA: | 80 km/h / 50 mph |
| Stall speed, VS: | 18 km/h /11.2 mph |

## Recommended setup

| | |
|---|---|
| Motor: | Leopard LC2830 980KV (for 3-4S setup) |
| ESC: | 20A/3-4S |
| Propeller: | two blade GWS 9 x 6 |
| Battery: | Li-Pol 1500mAh / 4S |
| | printed PET motor mount |

## Performance measurement

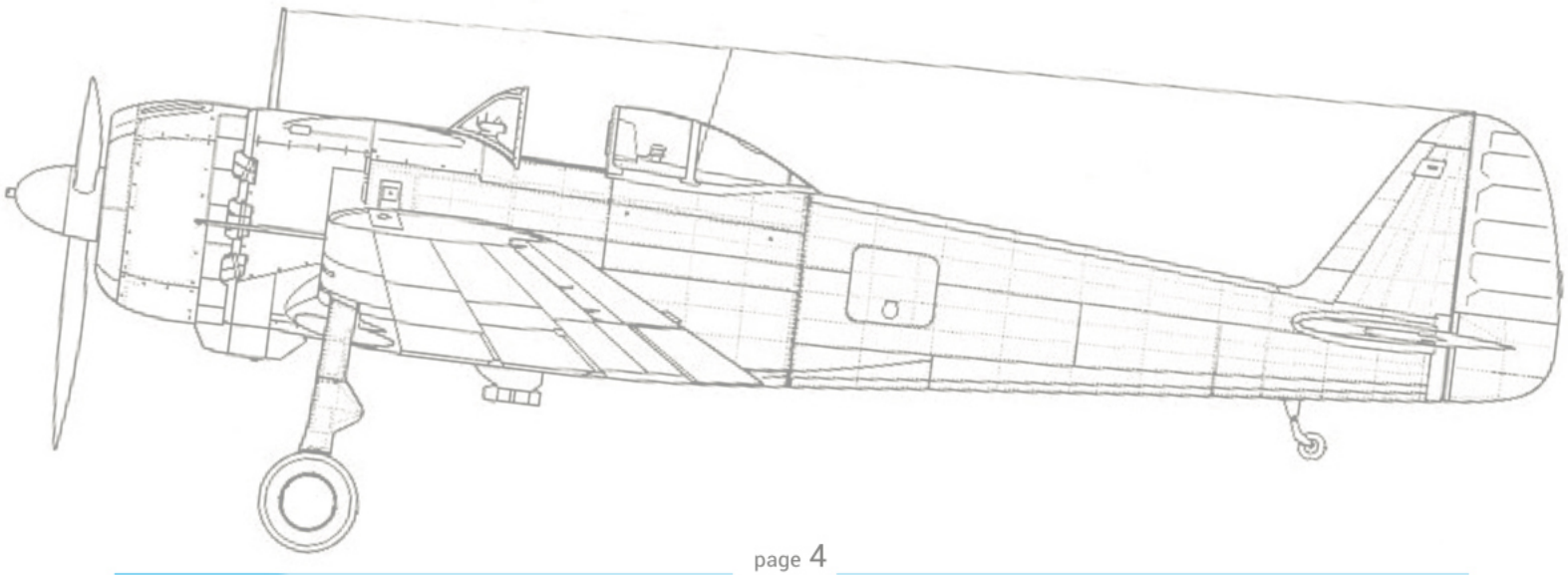
| | |
|---|---|
| Max speed VH (level flight): | 105 km/h – 56.7kn – 65.2mph with GWS 9x6 |
| Rate of climb: | 20 m/s (5 373 ft/min) with GWS 9x6 |
| Flight time (3s 1500mAh/full): | 8:30 with GWS 9x6 |

# Nakajima Ki-43 Hayabusa

The Nakajima Ki-43 „Hayabusa", known to the Allies as „Oscar," was the signature fighter of Japan's early Pacific campaigns. Introduced in 1941, it impressed friend and foe alike with its slim lines and extraordinary agility. In the dogfights over Malaya, Burma, and China, the Hayabusa could out-turn almost anything the Allies put against it, earning a reputation as a nimble but deadly opponent.

Its strengths, however, came at a cost. Armor protection was minimal, fuel tanks were vulnerable, and its armament of just two 12.7 mm machine guns left it underpowered against sturdier foes. Powered by a 1,000 hp Nakajima Ha-25 radial engine, it reached speeds of over 500 km/h (310 mph) and boasted a range of more than 1,000 kilometers (620 miles).

Though outclassed by newer fighters as the war wore on, the Ki-43 remained in service until the very end. Light, graceful, and fragile, it stood as the "Dancing Falcon" of the Pacific skies.



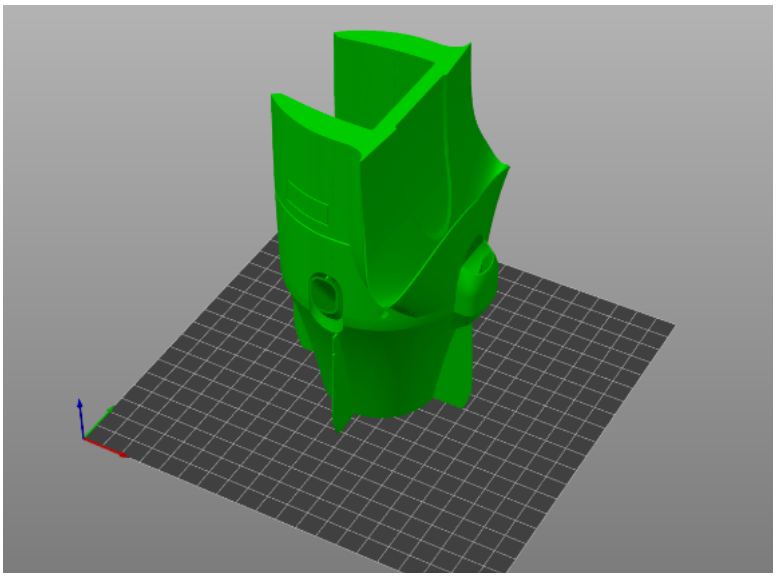
# Included:

## 1. 3MF 3D files (primary)

Used instead of STL files

3MF files can be used instead of standard STL files, but also include information about slicing in the new version of Prusa Slicer (since version 2.4). Open them directly in the Prusa Slicer as a project or import to the slicer of your choice. The files contain settings for printing on a direct drive printer with dimensions 200x200x200 mm, that can be further adapted to suit your printer. The generic settings are compatible with Prusa MK2/3/3S printers.

## 2. STL files - universal for all slicers



STL files are no longer necessary, as 3MF files can be imported to any slicer (Cura, Simplify3D) same as the STL files. Please use the 3MF files instead which contain more information than plain STL.

## 3. Printing Guide in our Help Section

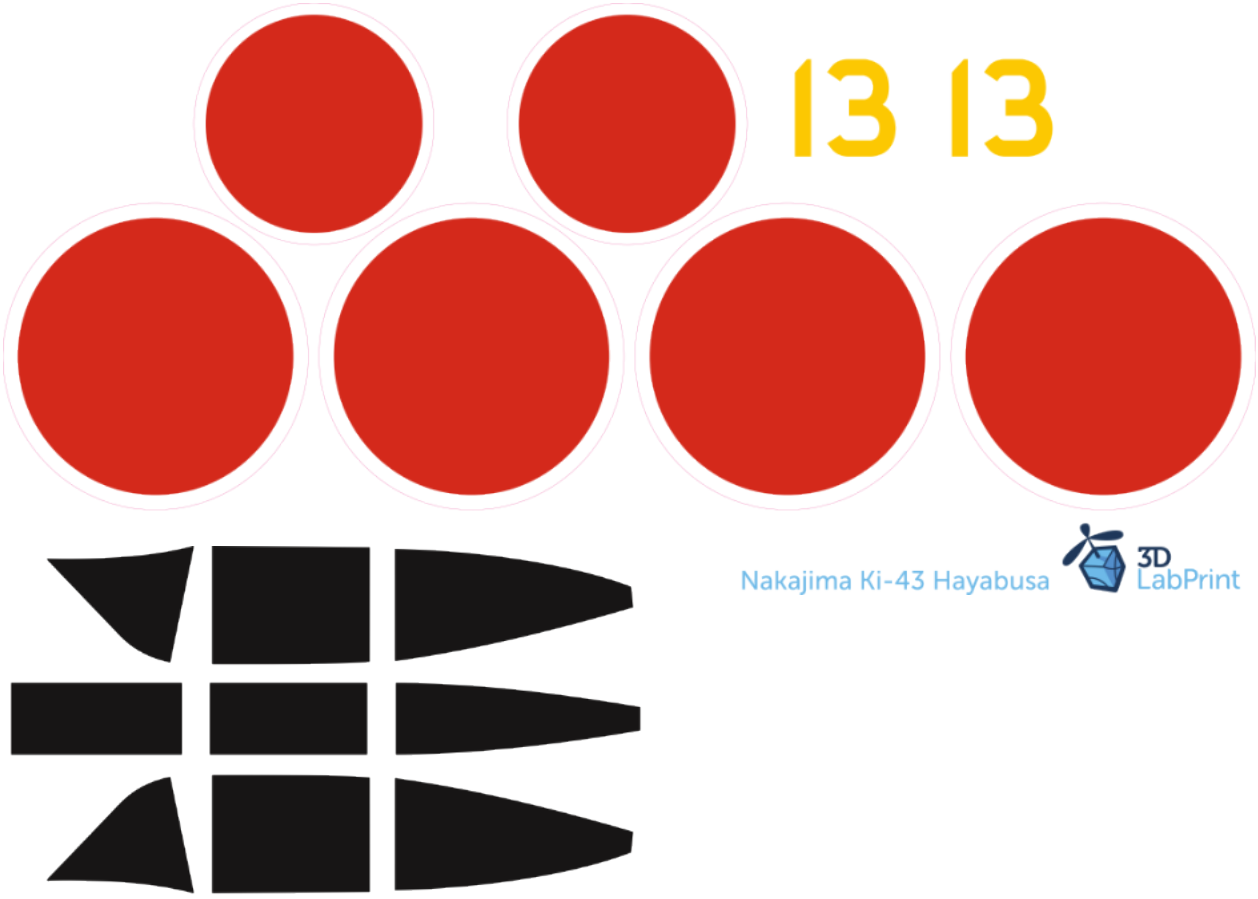
Apart from this userguide, please see the Printing Guide for PrusaSlicer, Simplify3D or Cura to find some Tips and Advice for airplane printing (Thin Wall Printing).Remember: We use 0 retraction and 0.4-0.5 flow with LW-PLA.

## 4. Gcodes

Basic Gcodes prepared for direct use, as universal as possible. Should work on i3 style printers, Give it a try, but we can't guarantee it will work on your printer. Wall thickness should be 0.55-0.67mm.

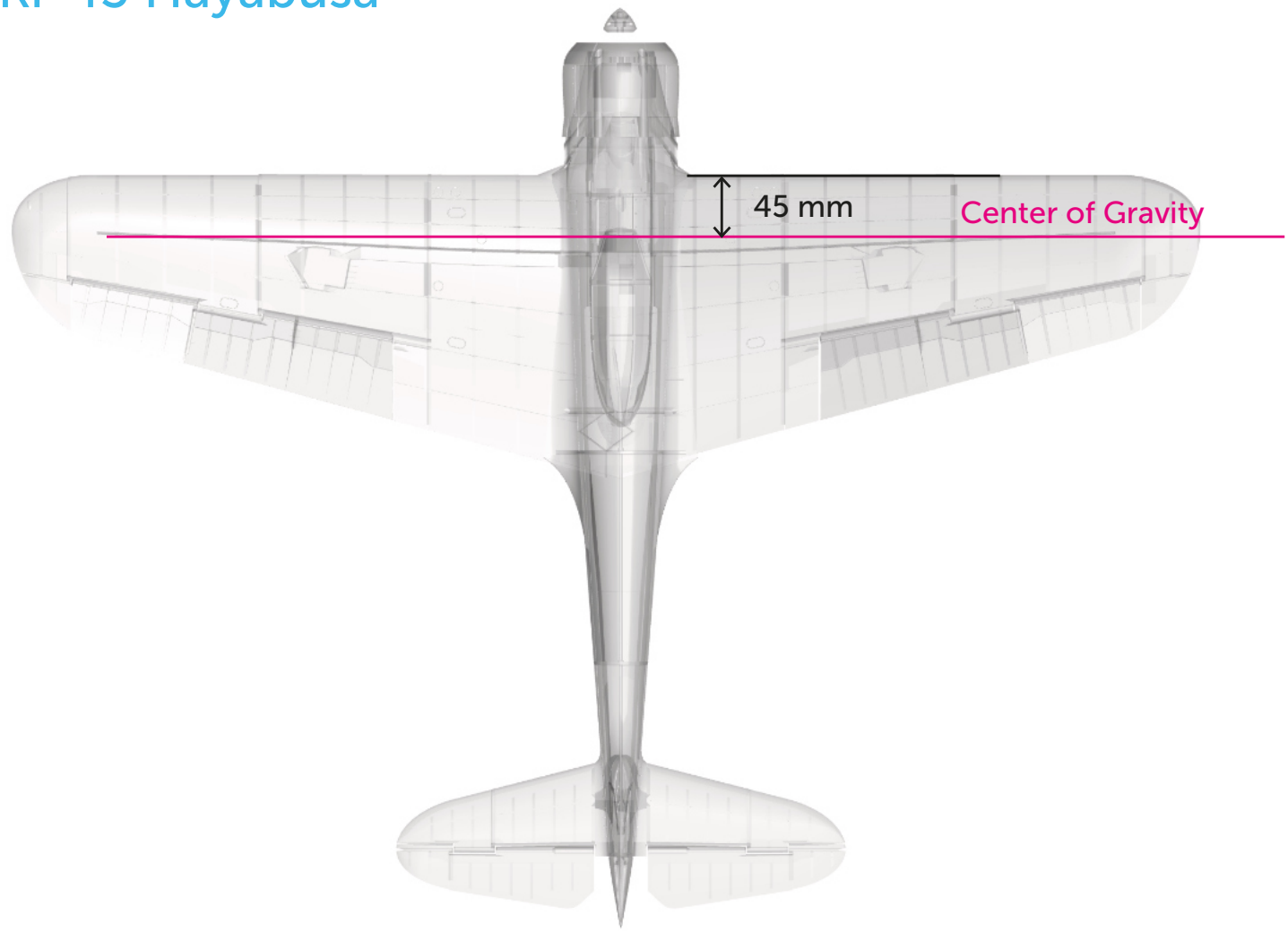
## 5. Scale markings PDF

You could print and cut the PDF in scale from thin self adhesive advertisement foil and place it on the model as needed.

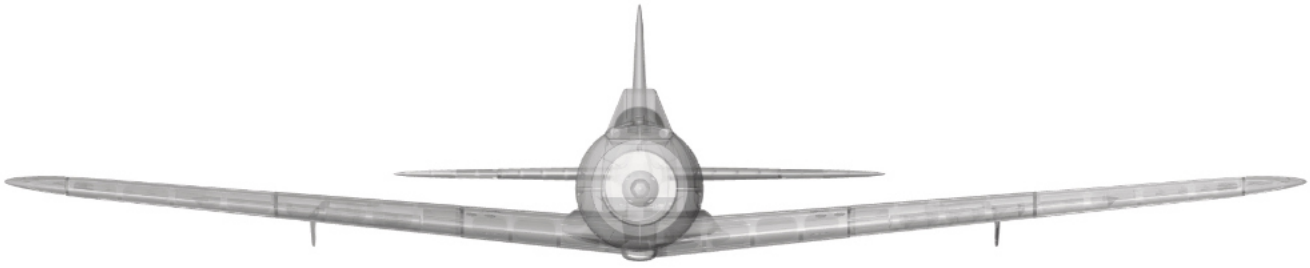



Nakajima Ki-43 Hayabusa 1:12 - cabin sheet

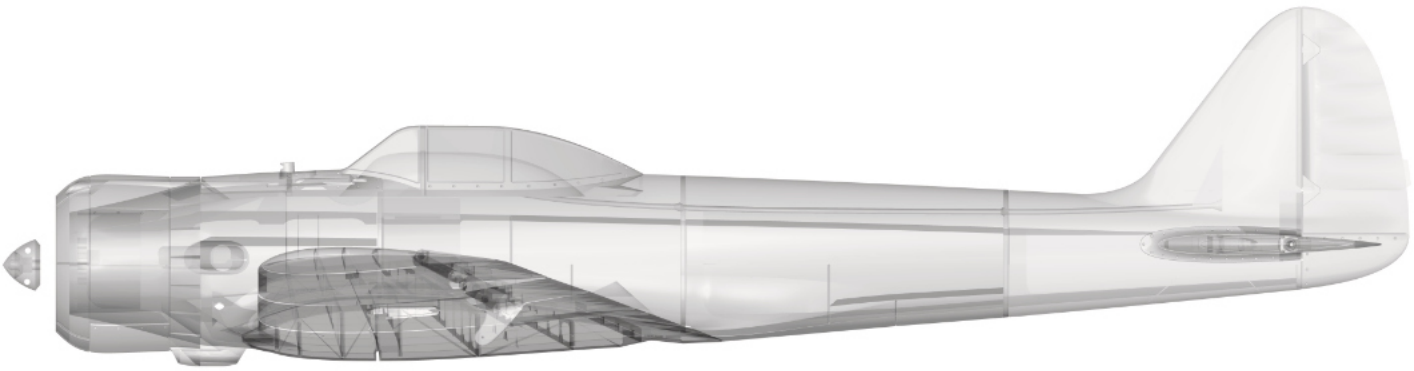
# Nakajima Ki-43 Hayabusa



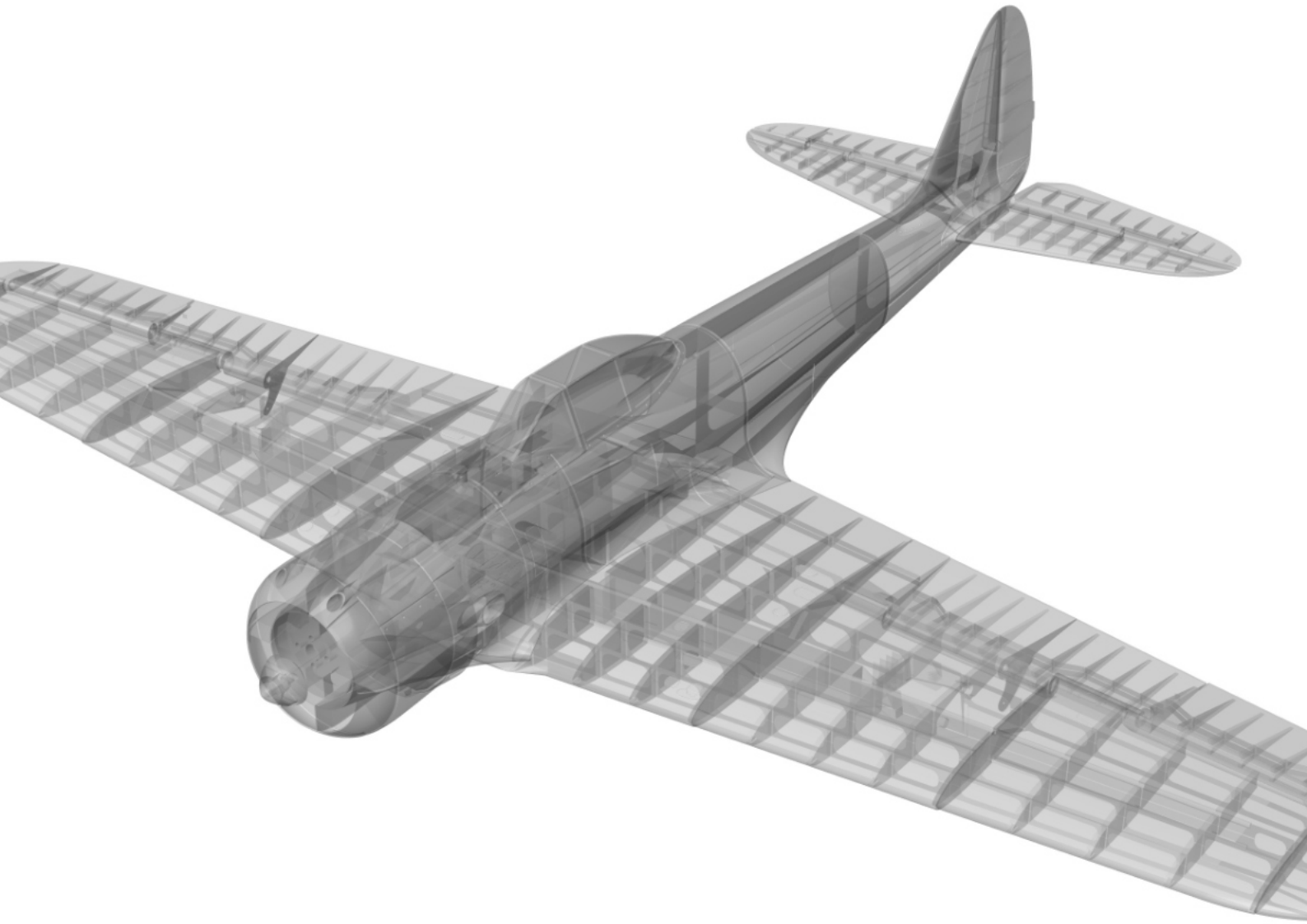

Wing area: 16,6 $dm^2$ / 1.79 $ft^2$ / 257 $in^2$



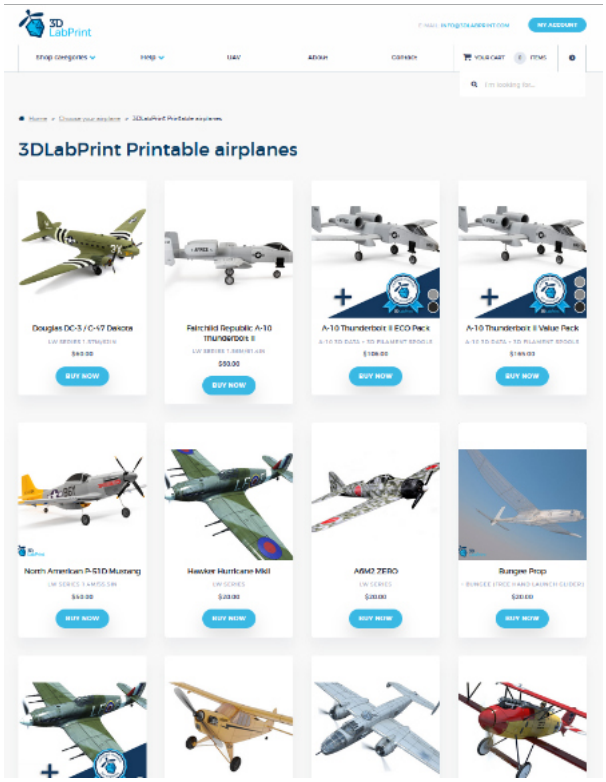
Wingspan: 950 mm / 37.4 inch



Lenght: 735 mm / 28.9 inch



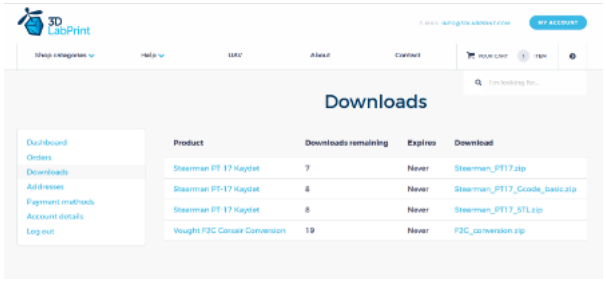
# Step By Step PDF/VIDEO userguide




## 1. Choose airplane

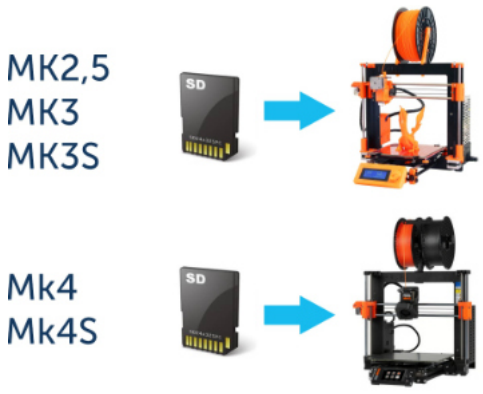
at www.3Dlabprint.com, visit our Facebook for latest info.

Basic requirments for Nakajima Ki-43 are 200/200/195 mm volume, nozzle 0.4mm recommended (0.35 or 0.5mm alternatively). Heated bed recommended. Designed to be printed with Polylight LW-PLA filament by 3DLabPrint.
Contact: support@3dlabprint.com




## 2. Create account, download

You will receive download link to all the zipped files to your email right after the checkout (please check your spam folder if not). If you are logged in with your account while purchasing the model, you will find the download link in your account's Downloads section on our website.
Please contact support@3dlabprint.com if you have trouble getting the files.



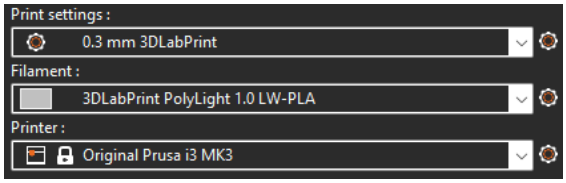

## 3. Prepare Gcodes

option A factory prepared G-CODEs:
if your printer is i3 comptatible you can use prepared gcodes directly. Just save them to the SD card and let the 3d printer do it's job. HE temperature is set to 240°C so the layers fuse together well, you can adjust speed and temperature only through your printer's LCD. If these Gcodes does not work for you, please proceed to the next options.


## option B Prusa Slicer 3mf files (recommended)

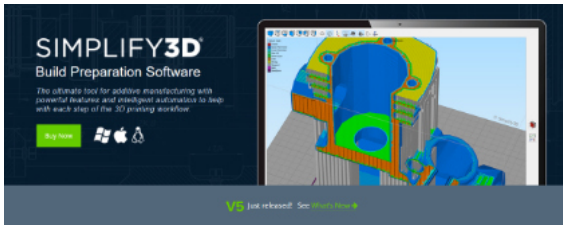
Please follow the guide in the Help section of our website about Prusa Slicer setup.
Drag and drop the 3mf file to the Prusa Slicer window and open it as a Project. It will create a Generic 3DLabPrint printer, printing profile and materials. Please use these as a starting point instead of your printer profiles provided by your printer manufacturer.
Strong thin-wall printing is a different discipline than printing Benchys what are the stock profiles usually optimized for. Once you tweak your profiles (retractions, etc.) you can easily switch the profile everytime you open the 3mf file. All the slicing tweaks, such as added top/bottom layers etc. are stored in the models below, so it won't be overwritten.

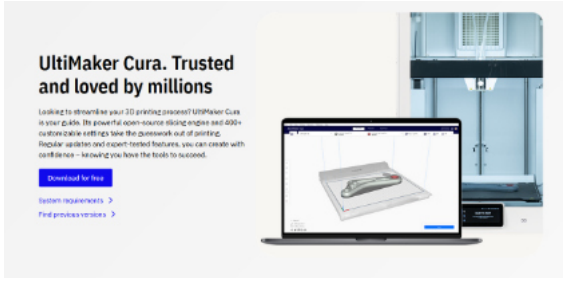

Remember: We are using 0.5 multiplier and 0 retraction for LW-PLA.
This method is also suitable for other common brands of printers, such as Creality (Enders), BambuLab and other. Prusa Slicer provides all the features we need and the settings are preconfigured in the 3mf files. Use the Print Settings and Filament profiles from our 3mf files and your Printer profile to ensure the compatibility.




## option C CURA or Simplify3D

CURA and Simplify3D option is for advanced users who insist on using it. There's no advantage compared to Prusa Slicer option but it still remains available. If you struggle with setting up Cura or Simplify3D, please use the option above which provides better results by default. You can import the Prusa Slicer 3mf files just like any other STL files but it won't import any print settings.




Please check our CURA guide or Simplify3D guide. Please visualise our presliced gcodes to see how the result should look like and try to achieve the same in your slicer.

Note: Simplify3D factory files are no longer provided as 3mf files are full substitute for them.

## 4. Print it

Save the Gcodes to the SD card and insert into your printer. Prepare your printer and start printing, we prefer to use SD card rather than direct USB connection. Scaling the model will lead to unusable results!

you will need: LW-PLA filament - (Polylight LW-PLA)
3DLac, Strong hair spray, PEI or your favorite adhesive bed surface
Razor blade

AND... please watch our VideoGuides:

LW planes

## Basic Tips and Advice

While stadard PLA filament could be used, this plane has been designed to be printed from foaming LW-PLA that means about 50% weight reduction on printed parts.

Please Experiment with temperature and extrusion multiplier (0.55-0.67mm Wall thickness). Hotend temperature is very important (220° up to 260° celsius). The temperature determines, how much the LW-PLA foams while printing. Cranking up temperature means, you can go lower on multiplier as the material will gain on volume. Turn OFF cooling fan for better layer adhesion (HE fan should be ON). We dont need it for thin wall printing. Heated bed is very recommended, 55-60° Celsius (to prevent warping ends).

Price of the LW-PLA may look a bit steep at first glance, but since we're using 50% less material thanks to the foaming feature, the cost difference is not so high as it looks.

## Please see the Printing Guide (Help Section)

# How to print PolyLight LW-PLA?

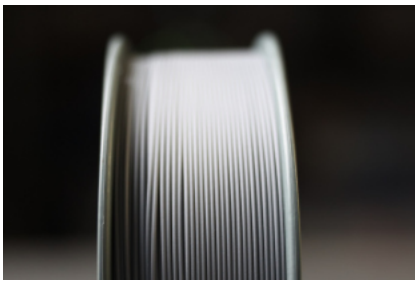
The basic print settings for LW-PLA are almost identical to those for standard PLA. The only difference is that the extrusion multiplier is set to 0.5 and retraction is completely disabled. The printed parts are designed to be printed in one go without the need for retraction.

The nozzle is constantly under pressure from the foaming material, so you don't have to worry about print failure. This method also works well with Bowden printers.

For best results on your printer, feel free to experiment with the extrusion multiplier and temperatures. This aircraft is designed for a wall thickness of **0.55–0.67 mm**.

Of course, you can try experimenting with retractions to reduce stringing inside the parts, but there is a high risk of clogging the nozzle or throat. Increasing the retraction distance above 1 mm is not recommended at all and usually leads to nozzle clogging caused by foaming. A more effective method seems to be cleaning hairy but functional parts after printing with retractions completely turned off.

Cosmetic problems with prints can be easily corrected with a knife or sandpaper, as LW is easy to sand and cut.



# 3DLabPrint Nakajima Ki-43 Hayabusa weights (LW-PLA)

| | | | | |
|---|---|---|---|---|
| **fuselage** | | | | |
| F1 | 22,4 | g | 0,79 | oz |
| F2 | 16,8 | g | 0,59 | oz |
| F3 | 13,5 | g | 0,48 | oz |
| F4 | 12,6 | g | 0,44 | oz |
| F5 | 3,9 | g | 0,14 | oz |
| cowl (PLA) | 14,35 | g | 0,51 | oz |
| fuselage cover 1 | 1,4 | g | 0,05 | oz |
| fuselage cover 2 | 2,6 | g | 0,09 | oz |
| fuselage cover 3 | 5,1 | g | 0,18 | oz |
| fuselage cover lock | 0,7 | g | 0,02 | oz |
| **wings** | | | | |
| wing L1 | 20,6 | g | 0,73 | oz |
| wing L2 | 13,8 | g | 0,49 | oz |
| wing L3 | 10,6 | g | 0,37 | oz |
| wing L4 | 2,45 | g | 0,09 | oz |
| wing R1 | 22,3 | g | 0,79 | oz |
| wing R2 | 13,8 | g | 0,49 | oz |
| wing R3 | 10,6 | g | 0,37 | oz |
| wing R4 | 2,45 | g | 0,09 | oz |
| aileron L1 | 4,35 | g | 0,15 | oz |
| aileron L2 | 3,2 | g | 0,11 | oz |
| aileron L3 | 3,55 | g | 0,13 | oz |
| aileron R1 | 4,35 | g | 0,15 | oz |
| aileron R2 | 3,2 | g | 0,11 | oz |
| aileron R3 | 3,55 | g | 0,13 | oz |
| **tail** | | | | |
| horizontal stabiliser L1 | 2,5 | g | 0,09 | oz |
| horizontal stabiliser L2 | 2 | g | 0,07 | oz |
| horizontal stabiliser R1 | 2,5 | g | 0,09 | oz |
| horizontal stabiliser R2 | 2 | g | 0,07 | oz |
| elevator L1 | 2,95 | g | 0,10 | oz |
| elevator L2 | 0,73 | g | 0,03 | oz |
| elevator R1 | 2,95 | g | 0,10 | oz |
| elevator R2 | 0,73 | g | 0,03 | oz |
| elevator arm | 3,5 | g | 0,12 | oz |
| **accessories** | | | | |
| motor mount | 12,4 | g | 0,44 | oz |
| battery holder (pair) | 2,2 | g | 0,08 | oz |
| servo covers (pair) | 1,4 | g | 0,05 | oz |
| **printed weight** | **248** | **g** | **8,75** | **oz** |

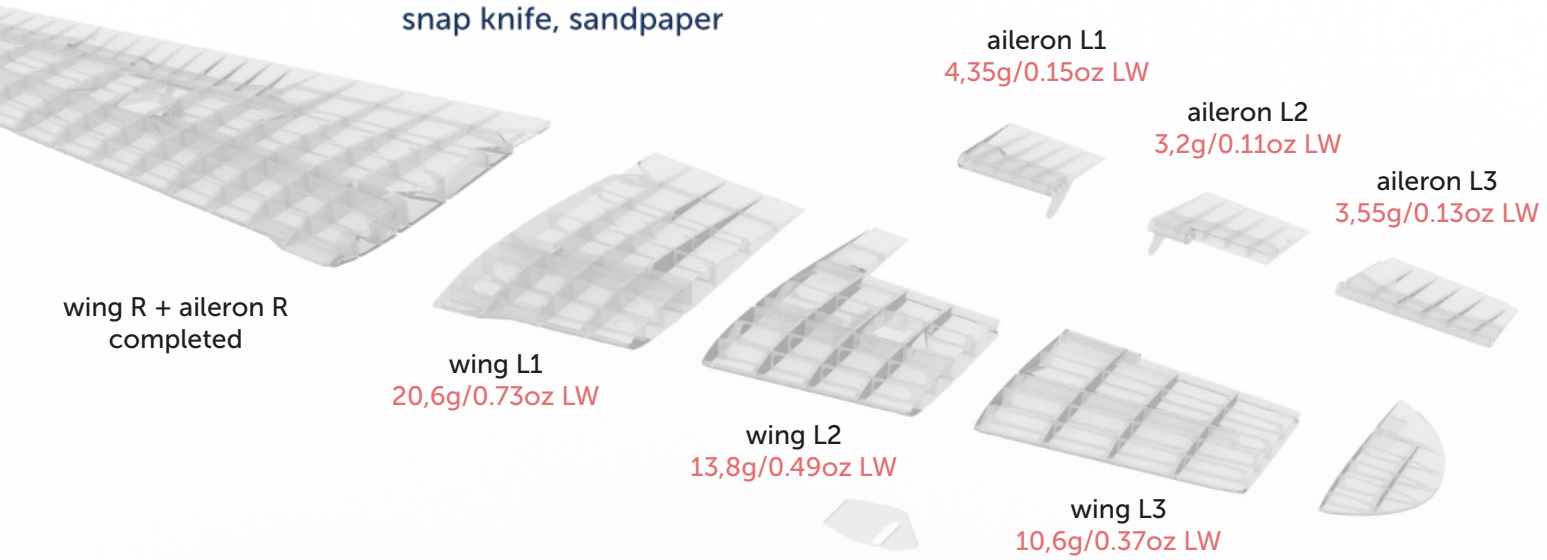
# 5. Assembly of printed parts

## 5.1 Wing assembly Nakajima Ki-43 Hayabusa

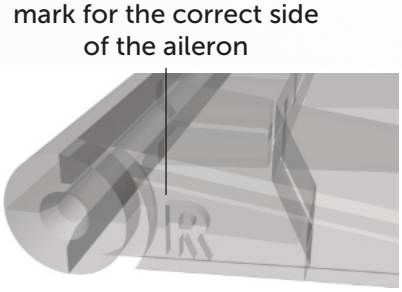
The slide-on system of printed parts makes assembly easier. It is best to assemble the center wing parts L1 and R1 first (remove the material at the opening for the binding rubber).
Then gradually glue the wing parts L2, R2, L3, R3, L4, R4 and check the straightness of the leading edge of the wing before final gluing. Use superglue (very thin has proven to work well) and an activator to speed up the curing of the glue.
As the main wing spar, press and glue a piece of PolyAir, PLA, PETG, or 1.5 mm carbon rod into the upper and lower holes to create and greatly improve the strength of the wing.
Glue the L1-L3 ailerons on a flat surface and repeat the process for the right side. Again, use a piece of filament or a suitable 1.5 mm carbon rod as a hinge for the ailerons. Simply insert it; there is no need to glue this hinge so that the ailerons or servo can be easily replaced.
The thickness of the printed wall of the parts should be 0.55-0.67.

Video guide Nakajima Ki-43 Hayabusa - wing assembly


you will need: CA Glue - medium + Activator for CA Glue
PolyAir or PETG filament
(alt. 1,5mm carbon, fiberglass wire)
snap knife, sandpaper





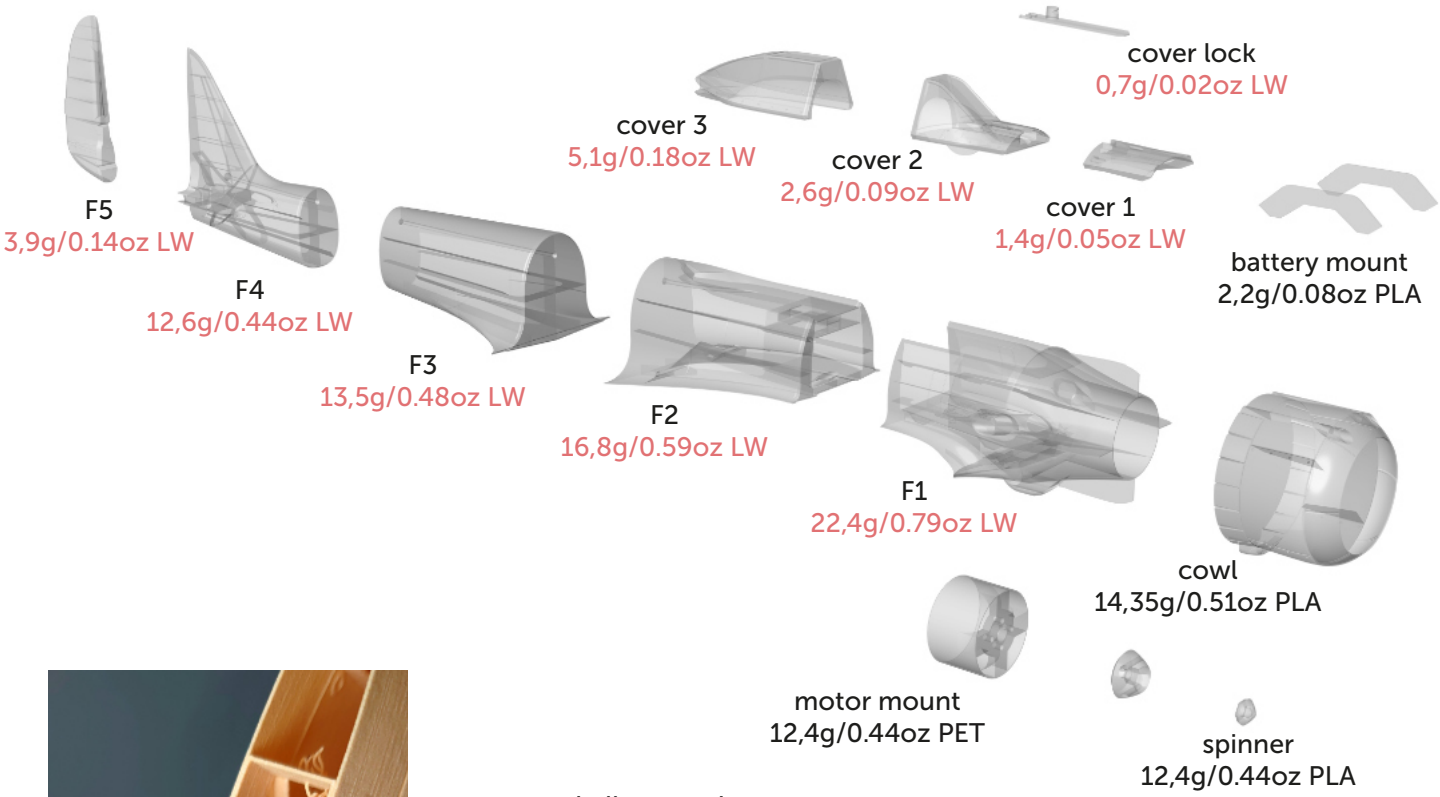



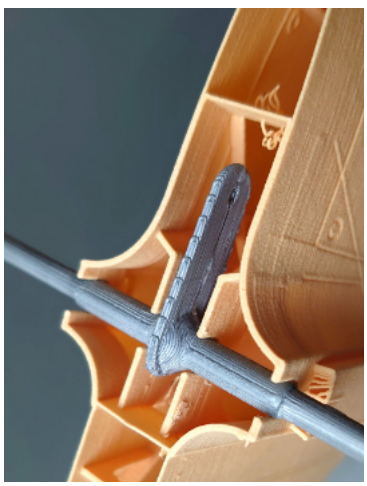
## 5.2.1 Fuselage assembly Nakajima Ki-43 Hayabusa

You can use a utility knife or sandpaper to clean the surface of the printed parts.
The part locking system will help you assemble the parts easily. Glue the F1-F4 fuselage parts together using superglue. Before gluing, check that part F4 is aligned with the wing. Do not glue part F5 (rudder) before assembling the tail and elevator. The wall thickness should be between 0.55 and 0.67 mm.
Use a spring from a ballpoint pen to secure the fuselage cover. Insert it into cover 2 and glue it to cover 1.

Video guide of the Nakajima Ki-43 Hayabusa - fuselage


you will need: CA Glue - medium + Activator for CA Glue,
snap knife, sandpaper
BallPen Spring

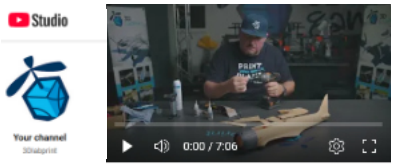


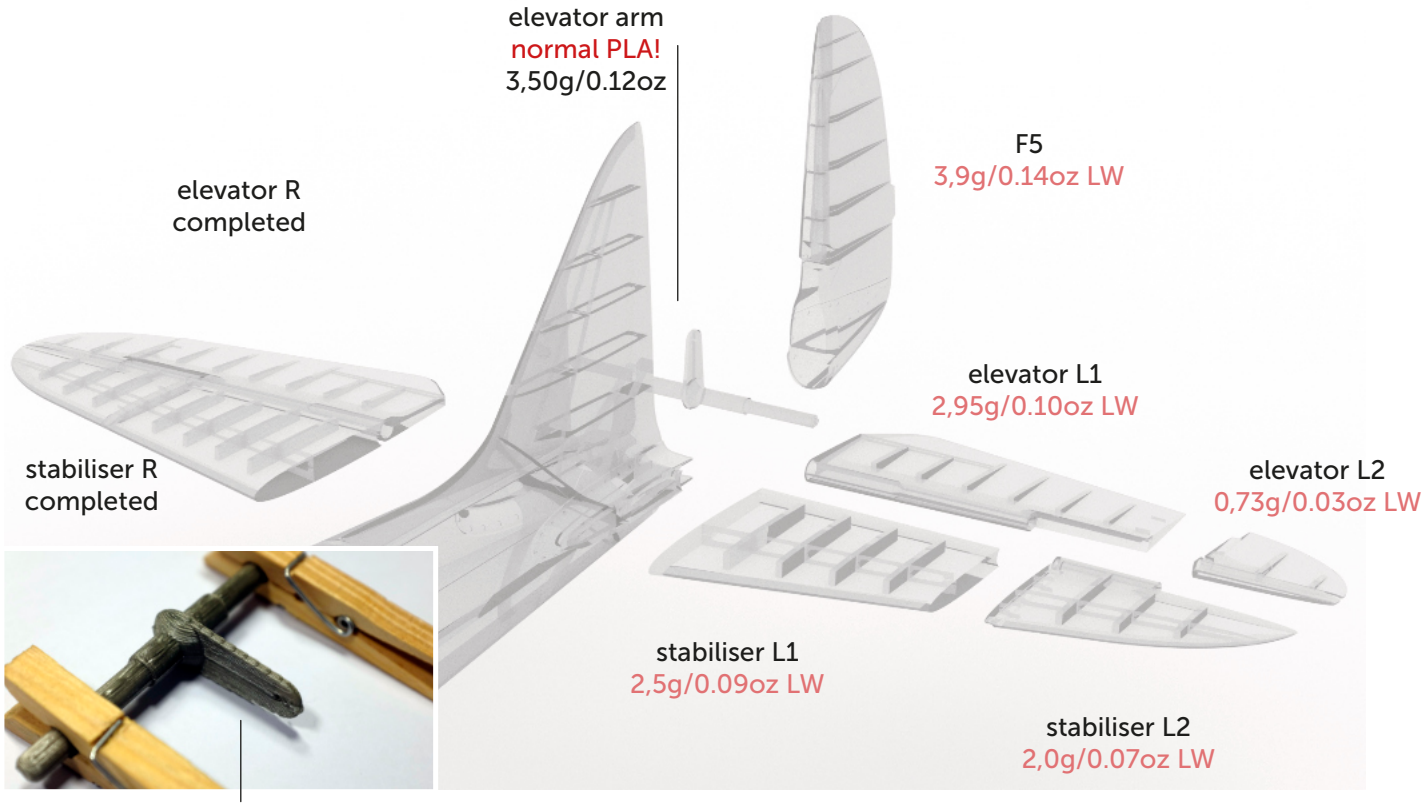
## 5.2.2 Tail assembly Nakajima Ki-43 Hayabusa

Glue L1 and L2 parts of the stabilizer and elevator. Glue the stabilizers perfectly perpendicular to the fuselage. Assemble both sides of the elevator with the elevator arm on a flat surface. Make a Z bend on the elevator and rudder 0,8 mm pushrod wire. Mount the elevator assembly to the stabilizer using the piece of PET filament. Elevator should move freely controlled by the pushrod and servo. Check the functionality of the elevator assembly carefully.

See video guide Nakajima Ki-43 Hayabusa tail assembly

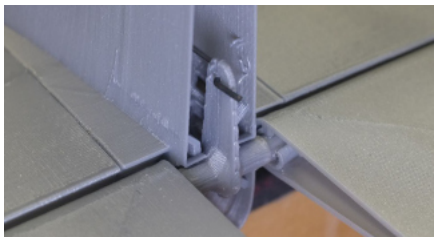



you will need: CA Glue - medium + Activator for CA Glue
Snap knife, SandPaper
1x 500mm of 0,8 mm steel wire for pushrod






elevator arm only for fixed rudder version – normal PLA!
Tip: After gluing, the elevator coupling is smoothed into a perfect shape using a drill and sandpaper.

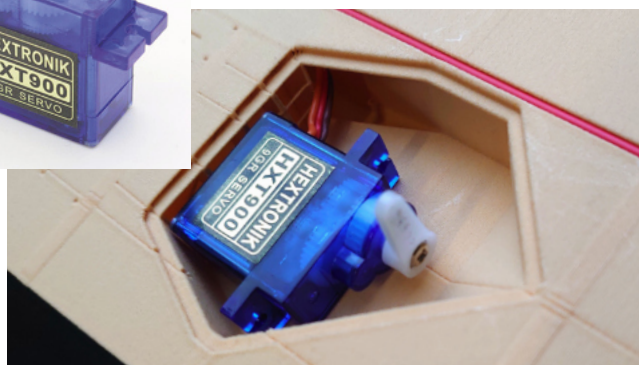


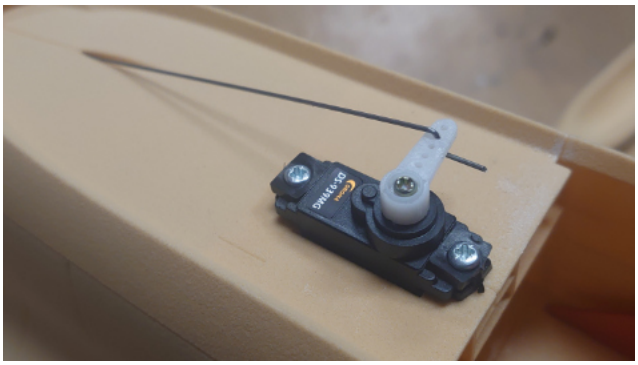
## 6. Servo installation

Install the prepared servos to wing servo bays. Use a 1mm steel wire with Z bends as a linkage between the servos and aileron control horns. Elevator servo will be fixed by servo holder or directly glued in the fuselage.

See video guide Nakajima Ki-43 Hayabusa servo assembly


you will need: 4x HXT900 or any similar sized servos
23x12x26 mm / 0.74x0.42x0.78 inches
Servo cable extension
Snap knife, Z pliers

## 7. Motor & ESC & battery holder

Fix the battery by velcro tape and mount it in the front of the fuselage, find the perfect balance and CG position by moving it. Mount the motor using 4x M3 screws and nuts to the printed universal motor holder 16 x 19 mm. For long motors you can flip the holder to the front (as at picture). Glue universal motor mount with motor into the fuselage in right position.

See video guide motor setup

you will need:
4x M3x10mm screws + washers


## LW planes setup (230W)

Motor: any 2830 / 1000KV, opt1, opt2 or similar
ESC: any 20A/3-4s, opt1, opt2 or similar
Propeller: two blade 9 x 6 or opt1 or any 9/5-6 CCW
Battery: 1300 - 1500mAh / 4s
Batt. connector: XT60 or Gold Conn
printed PET mount 16 x 19 mm

# 8. Painting/marking and Final assembly/setting

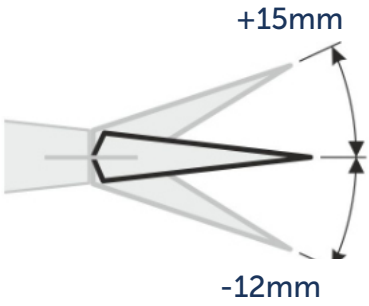
Another advantage of Polylight LW-PLA is that it can be dyed with almost anything. The surface for self-adhesive decals is ideally treated with a clear acrylic spray varnish. Use your imagination and send us photos of your aircraft on social networks.

See video guide Nakajima Ki-43 Hayabusa - final setting

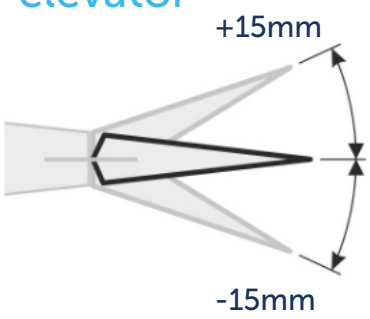

Refer to your R/C system userguide for setup information.
you will need: Your own Rx/Tx system
Velcro strip & rubber bands (for wing fix)

Install your reciever, connect battery, setup servos and etc. with your trasmitter, check servo position, then install propeller.
Make sure the battery is positioned properly and secured with velcro or battery holder, if battery moves during flight it can shift the center of gravity backwards and aircraft will become uncontrollable! Never set ESC with propeller installed, this could be very dangerous!

## aileron

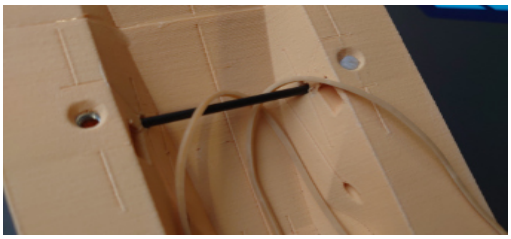



## elevator




## rubber band wing fix

Use 3 mm carbon rod
85 mm back and 115 mm front.
Fix the wing by cross rubber.



# 9. Go flying

Pre-flight check center of gravity is very important (move it 5mm forward for the first flights), battery properly charged, ailerons and elevator deflection check, your own flying skills or RC simulator training ...

Flight video of Nakajima Ki-43 Hayabusa


## 10. Pilots Please Attention!

For the first flights we recommend setting the center of gravity to around 5 mm forward of the CG tag - nose heavy, this increases the stability (you can use heavier battery). Increasing expo settings on your transmitter for elevator and ailerons to 80 % calms response from your stick inputs. Also you can decrease elevator, rudder and ailerons deflection to calm down the plane.
Make sure the battery is well fixed in proper possition. If it moves during flight it will cause shifting of CoG aft and will result in uncontrolable flight behavior.

After gaining some confidence you can balance the plane to the Center of Gravity marks and set Expos to 60 % as shown in the video/instructions... this gains back extra maneuverability.

Never fly aft positioned Center of gravity.

Please, use these files only for your own purpose, do not redistribute or publish. Thank you very much. Enjoy your flight.

## Enjoy the fun together!

Ki-43 is the next of new LW Planes series designed for easy and cheap flying. The build is simple even for a beginner. It's very low weight, easy assembly and fantastic flight characteristics makes this model an ideal plane for beginner RC pilots.

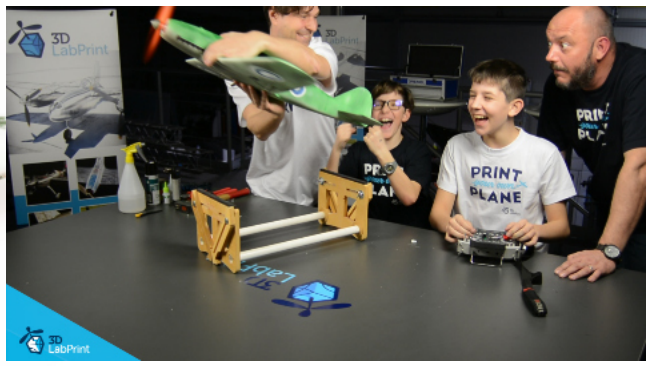
Very suitable for dads and kids. Children will learn some modern building skills and technology and most of all have fun. This is the reason, why every dad should have a 3D printer at home.

This model has been completely designed with the new PolyLight LW-PLA material in mind.

Parts printed from this LW-PLA are light, easily sanded and glued together. This model requires only about 300g of this material, that means it's a very cheap build. In case of accident, parts can be easily reprinted with just a filament cost.

We've been testing this material for a years before this plane was released... The material is using an active foaming technology to achieve lightweight, low density PLA parts. At around 230°C this material will start foaming, increasing its volume by nearly 3 times.

Almost all parts of this plane should be printed from LW-PLA (some specific parts needs PLA or PETg).



# Shopping list

| | |
|---|---|
| Printing material: | Polylight LW-PLA<br>a few of PLA or PETg (elevator arm, motor mount, ...) |
| RC: | R/C system, 4 channels |
| Motor: | 2830/1000KV, opt1, opt2 or similar |
| Propeller: | two blade 9 x 6 or opt1 or any 9/5-6 CCW |
| ESC: | any 20A/3-4s, opt1, opt2 or similar |
| Battery: | 1300 -1500mAh/3-4s<br>+connectors XT60 or Gold Conn |
| Servos: | 3x HXT900 or any similar sized servos<br>23x12x26 mm / 0.82x0.47x0.86 inches<br>Servo cable extension<br>Snap knife, Z pliers |
| Glue: | CA Glue - medium + Activator for CA Glue |
| Other: | 1x 1mm or 0.8 mm pushrod wire<br>4x M3x4mm screws + washers (motor)<br>2x rubber band (wing) |