



User Guide

rev. 2017/04



Fully 3d printable

MiG 15 - electro ducted fan airplane

scale ~ 1:8, wingspan 1220mm (48in)

MiG 15 – fully printable R/C plane for your desktop 3Dprinter

Future of flying - Print your own plane. [Speedy guide](#)

We still trying move things further, so this project is again full of other improvements for better durability , easier assembly , better geometry solution and so on..., we hope you enjoy it, although this print may test your competencies to and quality of your printer (welcome to the thin wall printing)

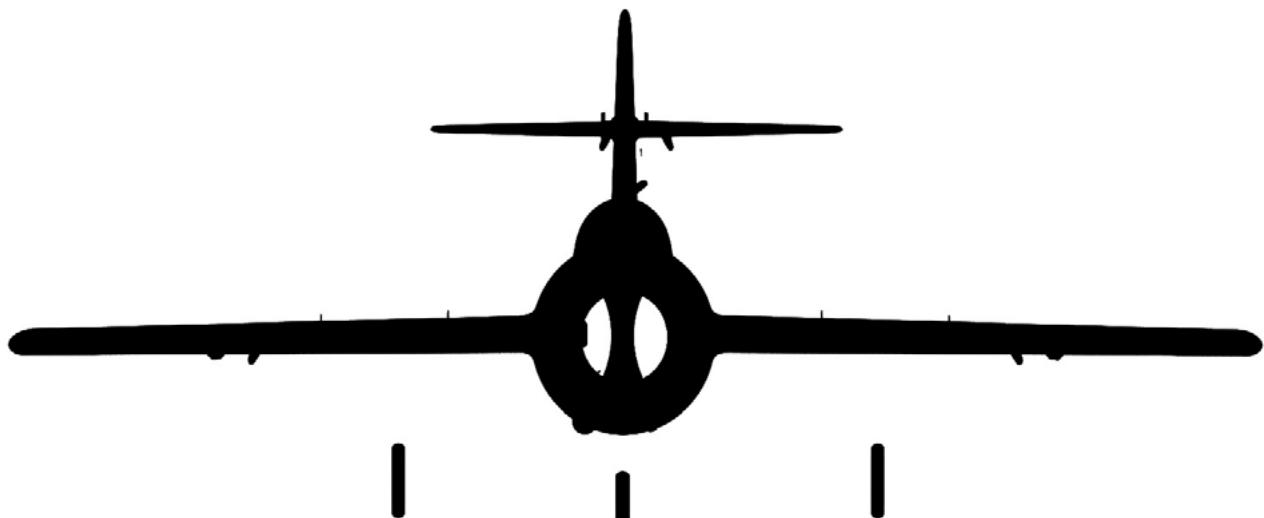
The first fully printable airplanes with suitable files prepared for your 3Dprinter. Flight characteristics are comparable or even better than classic build model airplane. Simply download and then print it anytime you need only for \$25 (filament cost). This is not a dream. Now you can print this HI-TECH at home, print spar parts, and so on...

Extensive hi-tech 3d structural reinforcement which makes the model very rigid while still maintaining a lightweight airframe and exact airfoil even when it is made only from plastic. This perfect and exact 3d structure is possible only due to additive 3dprinting technology. So welcome to the 21th century of model flying. Be the first at your airfield.

Easy to assemble, you do not need any extra tool or hardware, you only need to glue printed parts together and make pushrods for control. 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.

This our aircraft ir specialy designed the way that you dont need any nuts or aditional joining elements, just click all printed parts together.

You will get a superbly performing training and durable airplane suitable even for hard landings (with easy to change landing gear). Our Mig 15 is a spin-stall proof plane even in low speed tight turn.



General specifications:

Length:	1220 mm / 48,0 inch
Wingspan:	1220mm / 48,0 inch
Height:	460 mm / 18.1 inch
Wing area:	23 dm ² / 2,47 sq foot
Wing loading:	100 g/dm ² / 27 oz at sq foot
Center of gravity:	195mm (7,68 in) from LE See CG tags on wings...
Airfoil:	3DLabPrint modified
Print weight:	1374 g / 48.5 oz
Empty weight (w/o battery):	1724 g / 60.8 oz
Takeoff weight (2x 3s 2700 lipo):	2450 g / 68,6 oz
Max takeoff weight:	2650 g / 86,4 oz
Never exceed speed, VNE:	200 km/h / 125 mph
Design maneuvering speed, VA:	120 km/h / 75 mph
Stall speed:	50 km/h / 15 mph



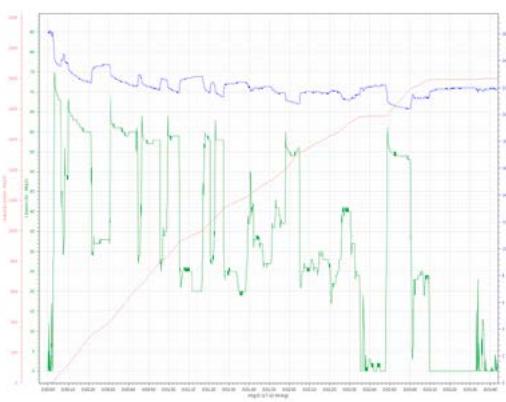
Powerplant

EDF:	90mm for 6S Li-Pol
Motor:	1750kv
EDF complets:	EDF unit with 1750kv Motor - 90mm Dr Mad Thrust 11-Blade Alloy 90mm or similar for 6S Li-Pol
ESC:	100A Electronic Speed Controller or similar 80-100Amps
Battery:	2x Li-Pol 2400mAh/3s (65C) , at least 260g / 9.2oz, 65C



Performance measurement

Max speed VH (level flight):	150 km/h 80 kn
Rate of climb:	90 mph with 6s Li-Pol
Flight time (2x 3s 2700mAh):	46 m/s (10 673 ft/min) 4:00min

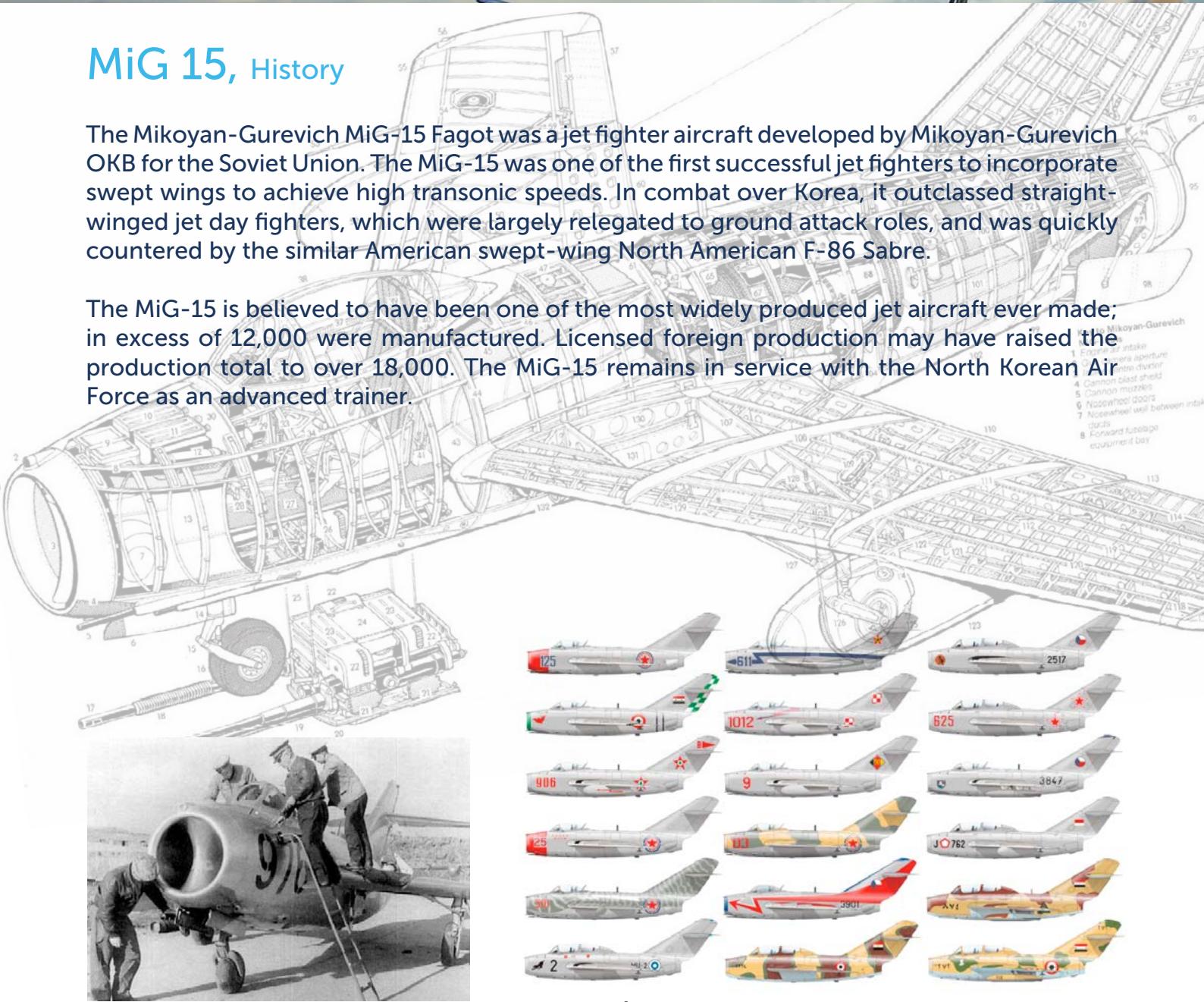




MiG 15, History

The Mikoyan-Gurevich MiG-15 Fagot was a jet fighter aircraft developed by Mikoyan-Gurevich OKB for the Soviet Union. The MiG-15 was one of the first successful jet fighters to incorporate swept wings to achieve high transonic speeds. In combat over Korea, it outclassed straight-winged jet day fighters, which were largely relegated to ground attack roles, and was quickly countered by the similar American swept-wing North American F-86 Sabre.

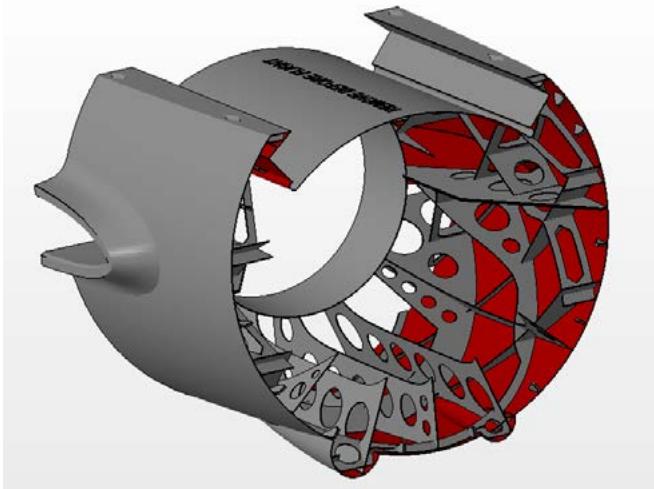
The MiG-15 is believed to have been one of the most widely produced jet aircraft ever made; in excess of 12,000 were manufactured. Licensed foreign production may have raised the production total to over 18,000. The MiG-15 remains in service with the North Korean Air Force as an advanced trainer.



Included:

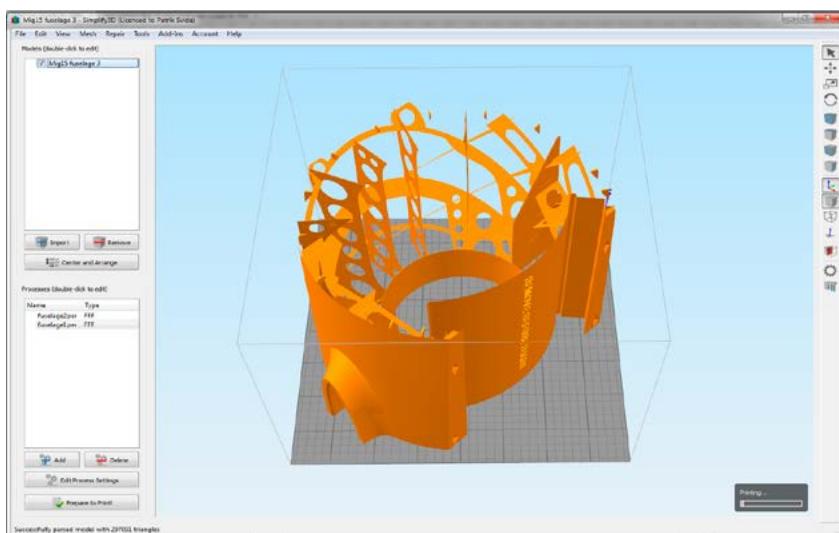
1. STL 3d files

Universal STL files designed for use with desktop FMD 3d printers and slicer software such as Simplify3D (recommended) CURA or MatterControl (these STLs are not compatible with Slic3r or Makerware slicers).



2. Factory files for Simplify3D slicer

with all our settings, these Factory files include all you need. Note: we use PRUSA i3 ORIGINAL printers so you may need to adjust the basic printing parameters to match your printer or use it as a starting point for you. Please look at [Simplify3D](#)



3. Step By Step PDF/VIDEO userguides

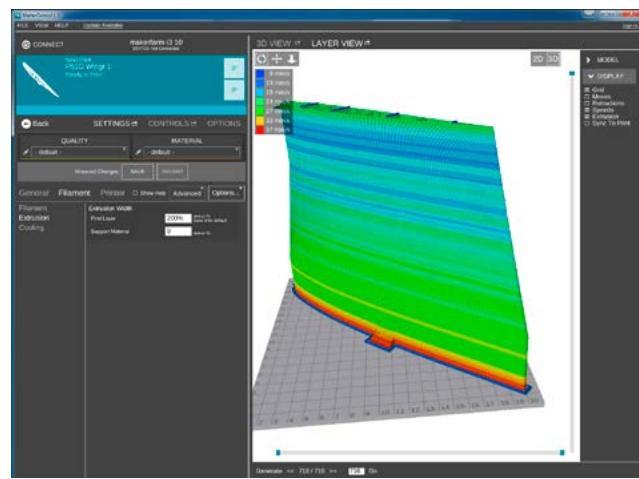
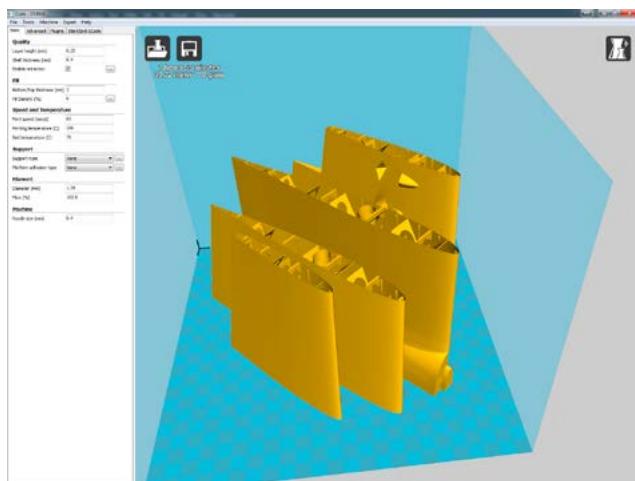
Apart from this userguide, please look at the Printing Guide with some Tips and Advices for airplane printing (Thin Wall Printing).

4. Gcodes

Basic Gcodes prepared for direct use, as universal as is possible. Should work with i3 style printers, you can try it out, but We cannot guarantee that it will work with your printer. 100% works with PRUSA i3 ORIGINAL 3d printers.

5. Prepared settings for CURA and MatterControl slicers

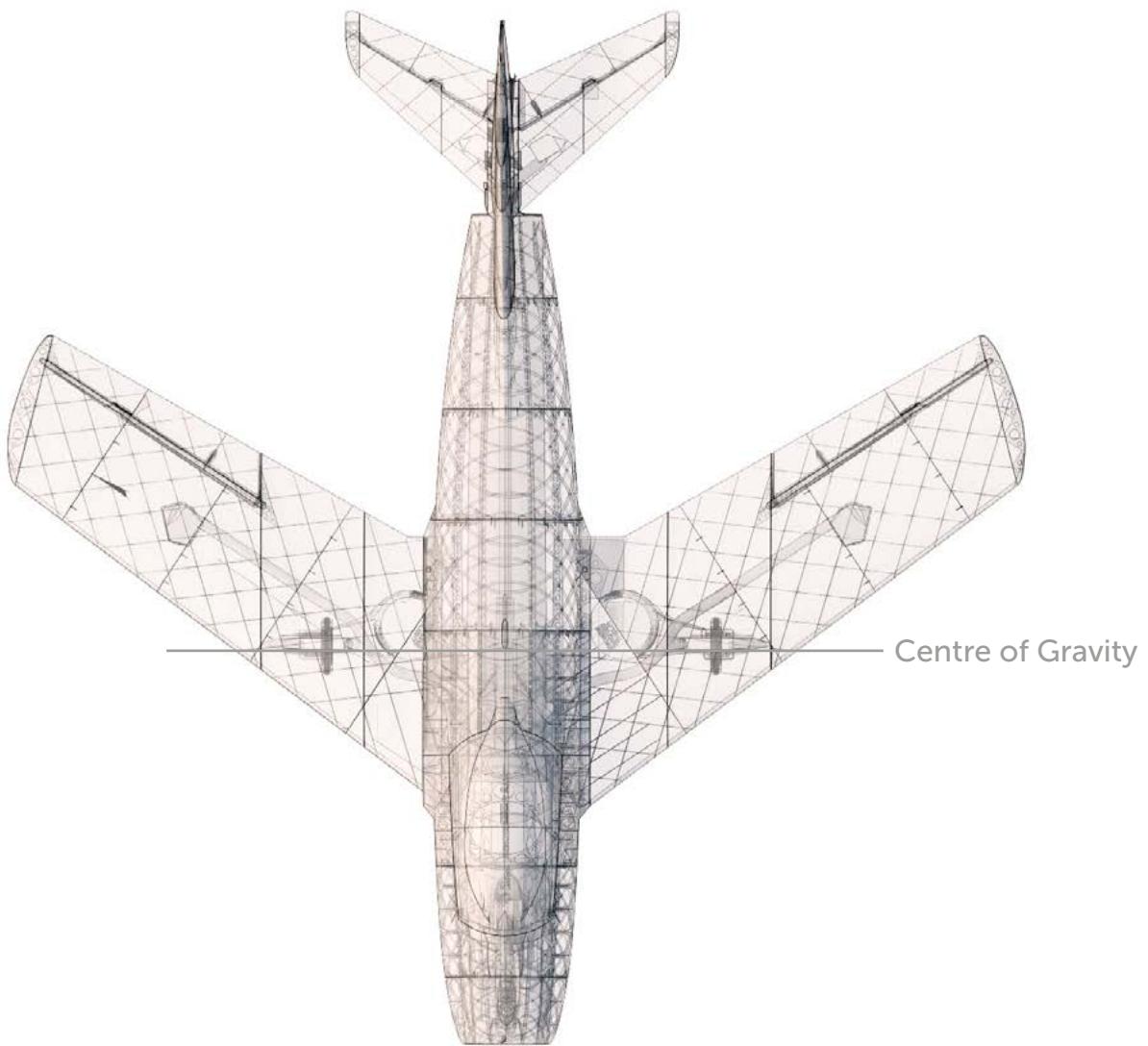
If you don't like Simplify3D for any reason, there is always the possibility to use another free slicer. You can use our basic setting (setting files) as a start point and edit it as you need.



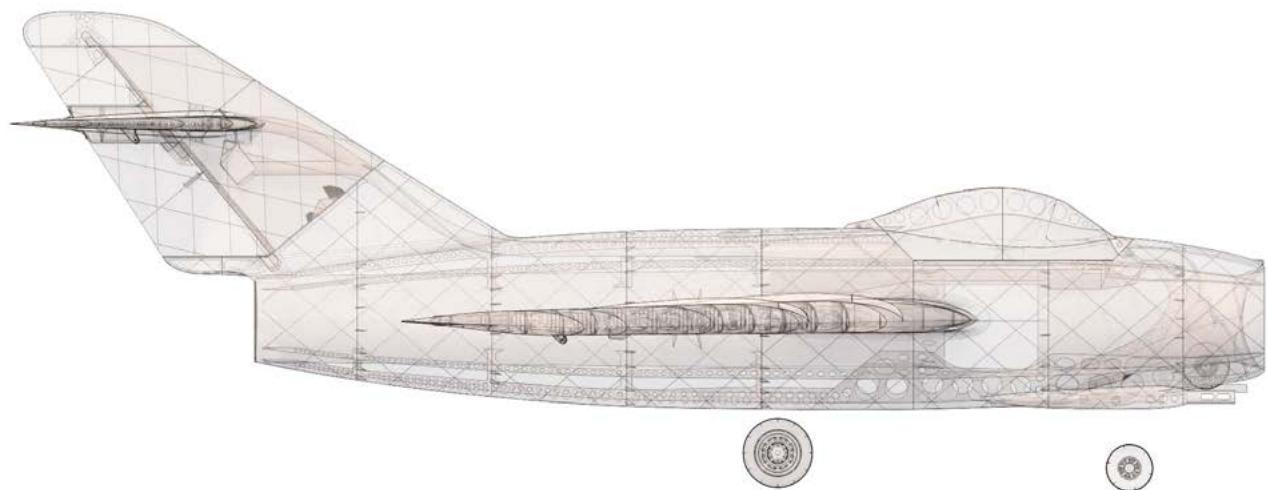
6. Scale markings PDF

Print this scale PDF at thin self tape advertisement foil and place it on the model as needed. Violet cut lines included.

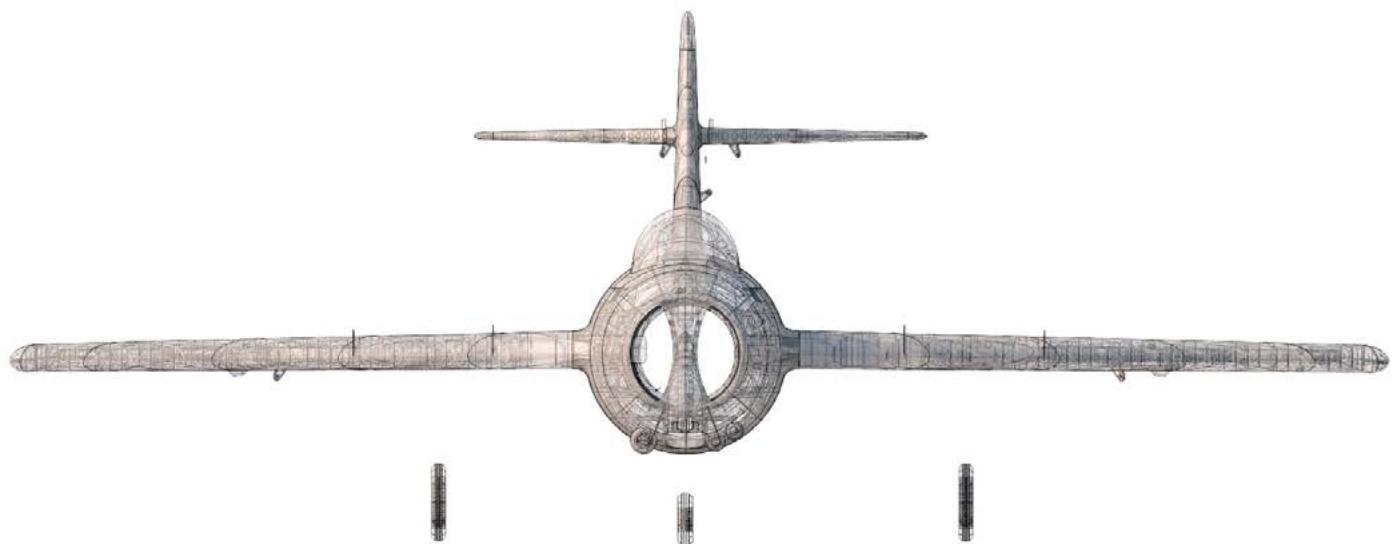




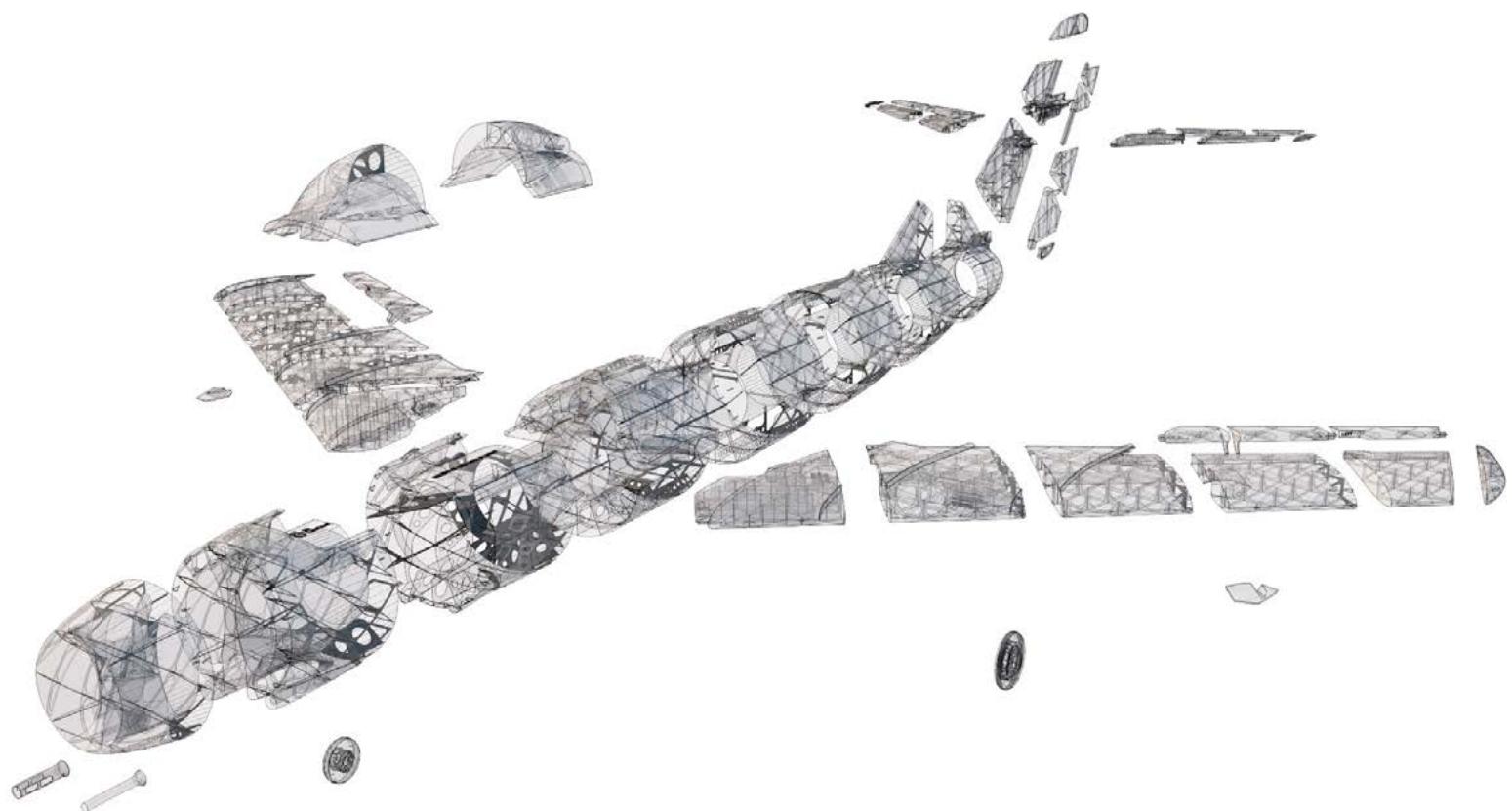
Wing area: 23 dm² / 2,47 sq foot



Lenght: 1220 mm / 48.0 inch



Wing span: 1220 mm / 48.0 inch



Step By Step PDF/VIDEO userguide

1. Choose airplane at www.3Dlabprint.com. Our [Facebook](#) for live information.



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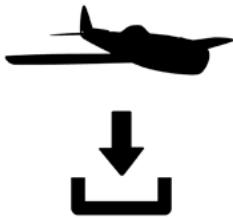
Basic requirements for Mig 15 is 195/195/150mm build volume. Nozzle 0.4mm recommended (0.35 or 0.5mm alternatively). Heated bed recommended.

PLA filament (or PETG, APLA, htPLA, PC-max.... not ABS) and some flex for tires...

If you feel a little bit confused you can download test part from our [FORUM](#) (usually the biggest part)

2. Create account, download

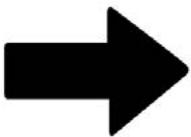
You will get the download link for all files sent to your email (zipped) or you can log in to your account and download directly from our websites.



3. Gcodes preparing

option A Gcodes:

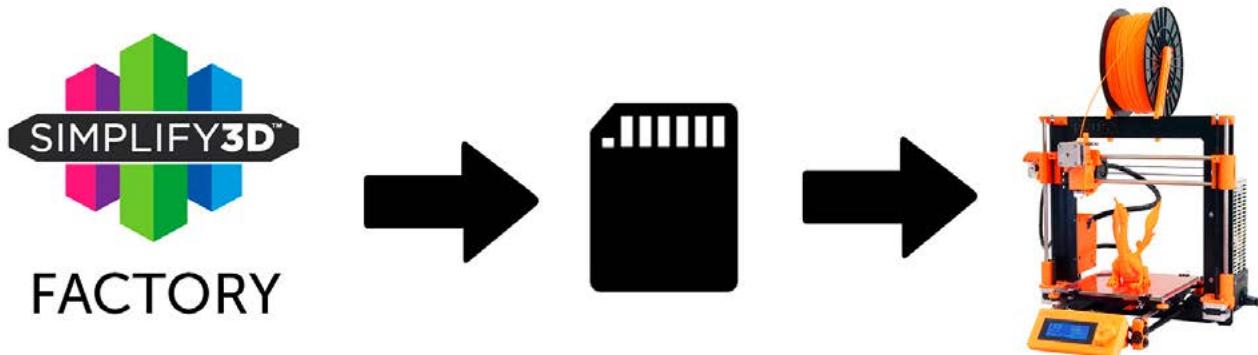
If your printer is i3 compatible you can directly use the [prepared gcodes](#). Simply save each to an SD card and let 3d printer do his job. The HE temperature is set to 230°C for best layer bonding. You can edit speed and temperature on your printer LCD only. If Gcodes does not work please proceed to the next options.



option B Factory files Simplify3D (recommended)

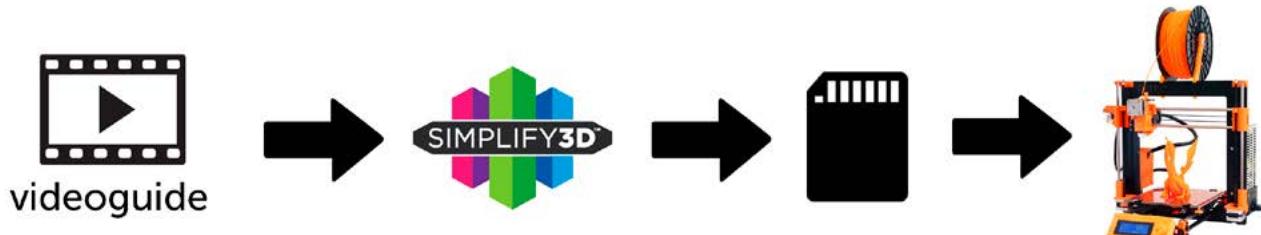
We prepare all you need in these files (basic FFF, parts arranged and so on...)

You can use our setting as a starting point and edit it as you need (adapt it for your printer), print only parts you need and so on... On most 3d printers it should work as it is, but please look at the settings and edit it if it is different for your printer. We are not liable for damages resulting from the use of our settings. If this does not work please proceed to the next option.



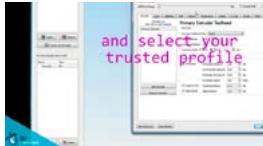
option C Simplify3D manual setting (watch and learn)

Use our [video guide](#) for proper setting. This is a very good option and you will learn a lot about Simplify3D and become a 3d expert. Of course you spend a lot of time and the youtube pause button will become your friend. Then please look to prepared Factory files with setting for rest of parts.

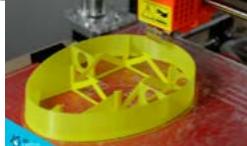


AND... please look at VideoGuides:

[video 2 Simplify3D setting](#)



[video about Thin Wall Printing](#)



option D CURA or MatterControl (but note: we recommend Simplify3D)

MatterControl and CURA are free :-) and also give very good results and the airframe is still strong enough. The slicer setting is very easy.

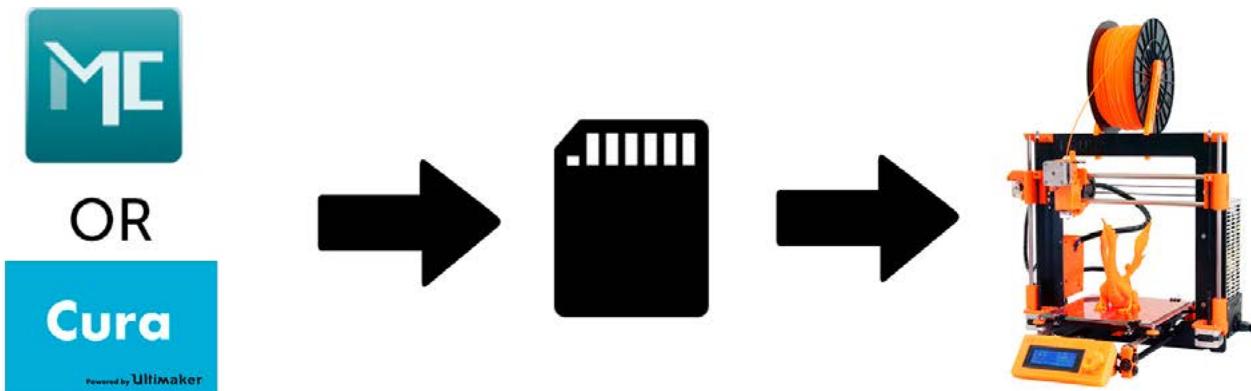
Please try to **find the right extrusion multiplier and temperature** for good weight and best layer bonding. Look at parts weight list for proper multiplier settings.

You can also use our predefined CURA or MC slicer setting file included in the package (always adapt it for your printer, change build volume, filament diameter and so on... depends on your printer!!!):

[CURA_wing_fuse.ini](#)
[CURA_ailer_elev.ini](#)
[CURA_thick.ini](#)
OR
[MC_wing_fuse.slice](#)
[MC_ailer_elev.slice](#)
[MC_thick.slice](#)

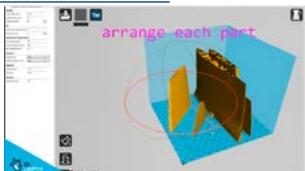
(wing and fuselage (expect1) parts) + [CURA_wing_fuselage_top.ini](#)
(only ailerons, elevator and rudder parts)
(fuselage1 only, struts, holders, landing gear...)

(wing and fuselage (expect1) parts) + [MC_wing_fuselage_top.slice](#)
(only ailerons, elevator and rudder parts)
(fuselage1 only, struts, holders, landing gear...)

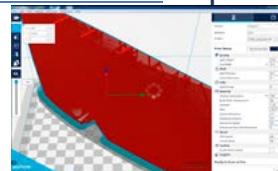


AND... please look at VideoGuides:

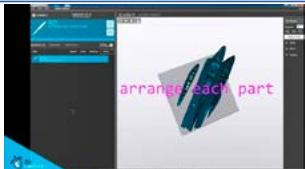
[video CURA slicer setting](#)



[CURA 2.3.1 import setting](#)



[video CMatterControl slicer setting](#)



4. Print it

Save generated Gcodes and insert SD card to your printer, prepare your printer and start printing. We prefer to use SD rather than a direct connection via USB Note: ABS filament is not suitable for this. Scaling the model will lead to unusable result!

Note: ninja flex or simmilar fillaments can glue very hard to PEI based surfaces be careful...
(lower the bed temperaturu)

You will need: PLA filament - good quality and strong PLA (we need good layer bonding)

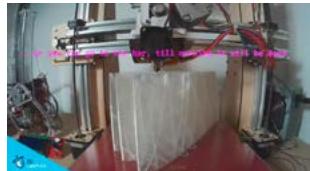
Strong hair spray (or your favorite adhesive bed surface)

Razor blade

(disregard with PEI or simmilar bed surface, Mk2...)

AND... please look at VideoGuides:

[video printing guide](#)



MiG 15 - parts diagram:



Basic Tips and Advice

Please experiment with your extrusion multiplier.

Also HotEnd temperature is very important for a strong result. Please try increasing the temperature to find the best value (215° up to 260° Celsius).

Turn OFF cooling fan for better layer adhesion (HE fan of course ON). We don't need it for our thin wall printing. You can use cooling fan for thick parts...

We try lot of filaments and so far PLA is still the best for our models (2017).

Heated bed is very recommended, 50-60° Celsius (print without warping ends).

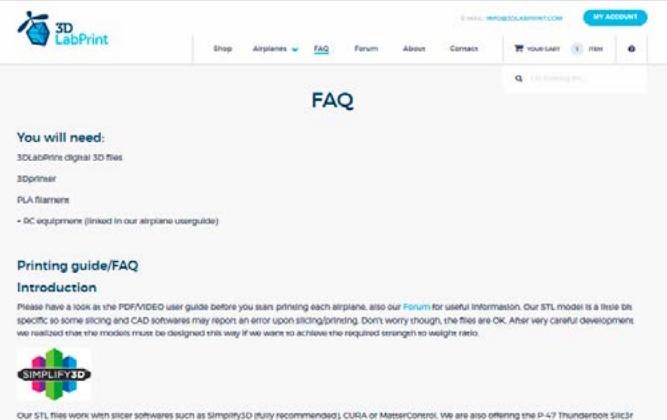
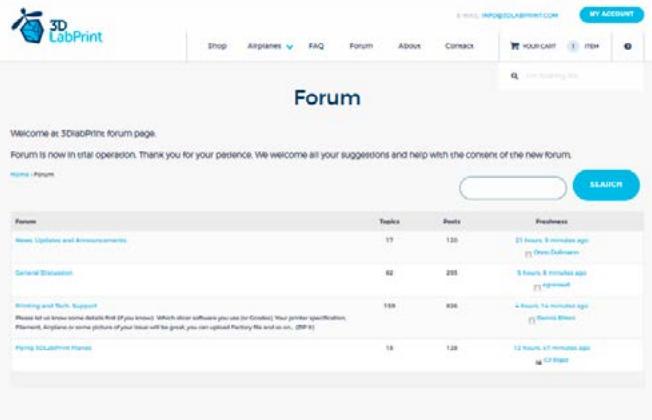
Looks like any standard quality PLA is perfect for our planes, but it always depends on combination PLA vs. Extruder vs. HotEnd.

We find that some color of filament has lower layer adhesion also.

Nowadays there are a lot of 3dprinters on the market, most of them are OK for printing our aircraft (specific thin wall printing...) sufficient volume, heated bed, 0.4 mm nozzle.

Please look at [FAQ](#) and our [Forum](#) for next information:

Need a help? our Forum is the best place... where we can help you

	
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5. Assembling printed parts

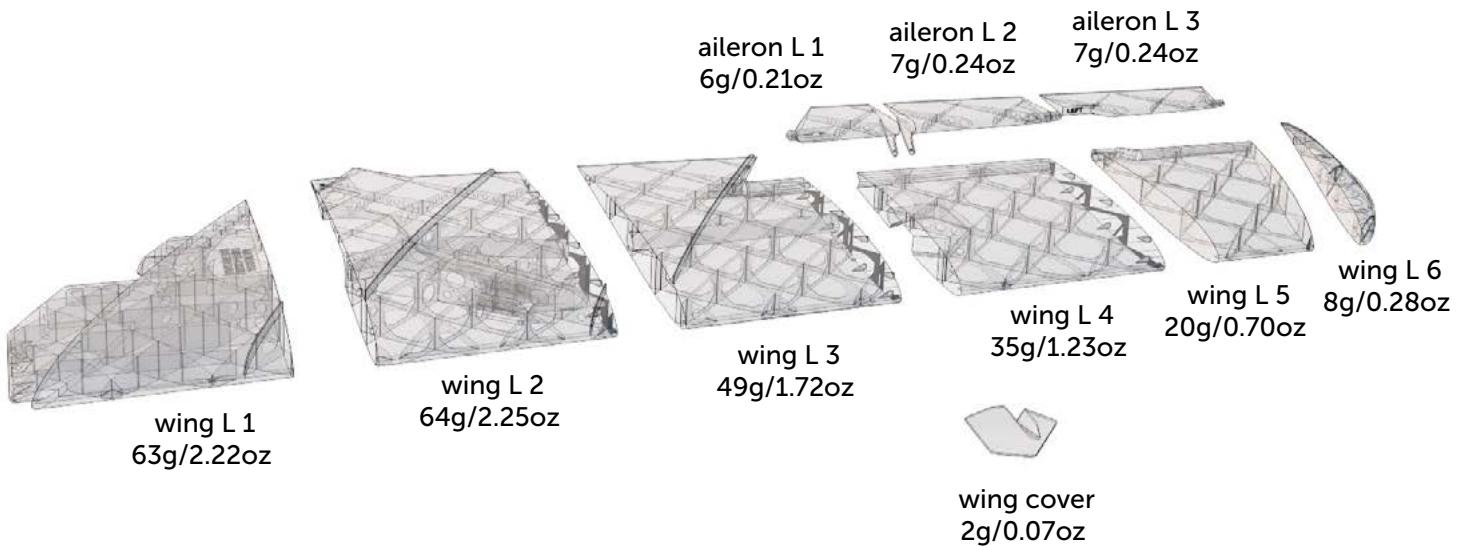
5.1 Wing assembly

Glue wing parts with CA glue together (position locks will help you), use activator. Install ailerons and flaps. You can use snap knife to clearing shape of some printed parts (mainly for the installation of the landing gear and ailerons), but mostly it is not necessary. Glue wing parts L1-L4, aileron L1 and L2, glue wing L5 for fix aileron, glue aileron L3, at last glue wing part L6.

NOTE: aileron part L3 must be glued after wing L5, wing part L6 must be glued as a last, after installing and gluing ailerons!!! (ailerons are locked with L5 and L6 parts). Repeat it at other wing side.

[See video guide #4](#)

you will need: [CA Glue - medium or similar medium viscosity CA glue](#)
[Activator for CA Glue or similar, but gas presurized aerosol is better](#)
 Snap knife



5.2 Fuselage assembly

Glue fuselage parts with CA glue together (position locks will help you) use activator. You can use snap knife to clearing shape of printed parts, but mostly it is not necessary.

Glue F1-F4 fuselage parts. Insert pen spring to F5 part, insert canopy lock, glue F5 to fuselage and test a canopy lock functionality. Glue all other fuselage parts F6-F9. Glue canopy parts and test perfect fit with fuselage and canopy lock functionality.

NOTE: Don't glue the tailparts yet !!! (for rudder, elevator and stabilizers proceed to next step)

[See video guide #5](#)

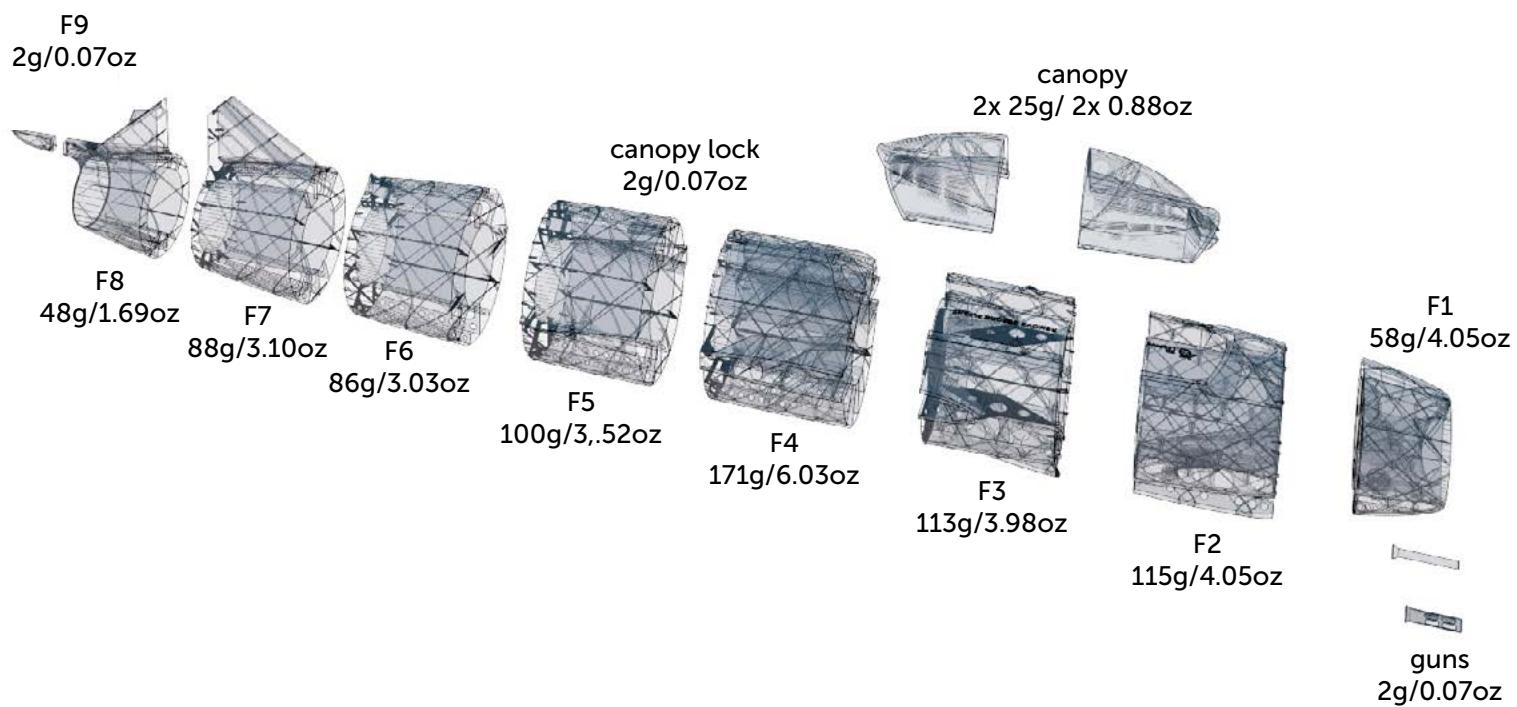
You will need: [CA Glue - medium or similar medium viscosity CA glue](#)

[Activator for CA Glue or similar, but gas presurized aerosol is better](#)

1x ballpoint pen spring (a spring from old ballpoint pen will work fine)

Snap knife

Soldering Iron or any hot tool



5.3. Fuselage tail - rudder, elevator pushrods and servos

Now is good time for install tail stabilizers, elevator, rudder and pushrods. You can use snap knife to clearing shape of printed parts. Glue rudder parts, vertical stabiliser and glue it to fuselage. Upper part of rudder holds bottom and V3 part holds rudder. For elevator hinge use shaped 1 mm / 14AWG pushrod wire or carbon rod. You can clean holes by hot wire.

Extend cables of 3x Hitec HS-65MG, HK-15179B or similar servos and 2x Hitec HS-81/82 or similar servos [Turnigy™ TR-1160A](#). Glue servos to prepared holes at stabilisers. Make Z bend or use your liked pushrods attachment. We like this [Pushrod Keepers](#). Thread pushrods and glue the elevator and rudder in correct position with CAglue.

NOTE: Complete horizontal stabiliser with elevator, hinges and servos on the desk. Glue it as last step to tail.

[See video guide #6](#)

[See video guide #7](#)

You will need:

[CA Glue - medium viscosity CA glue](#)

[Activator for CA Glue](#) or similar, but gas presurized aerosol is better

3x Hitec HS-65 MG or [HobbyKing™ HK15178 Analog Servo](#) or similar

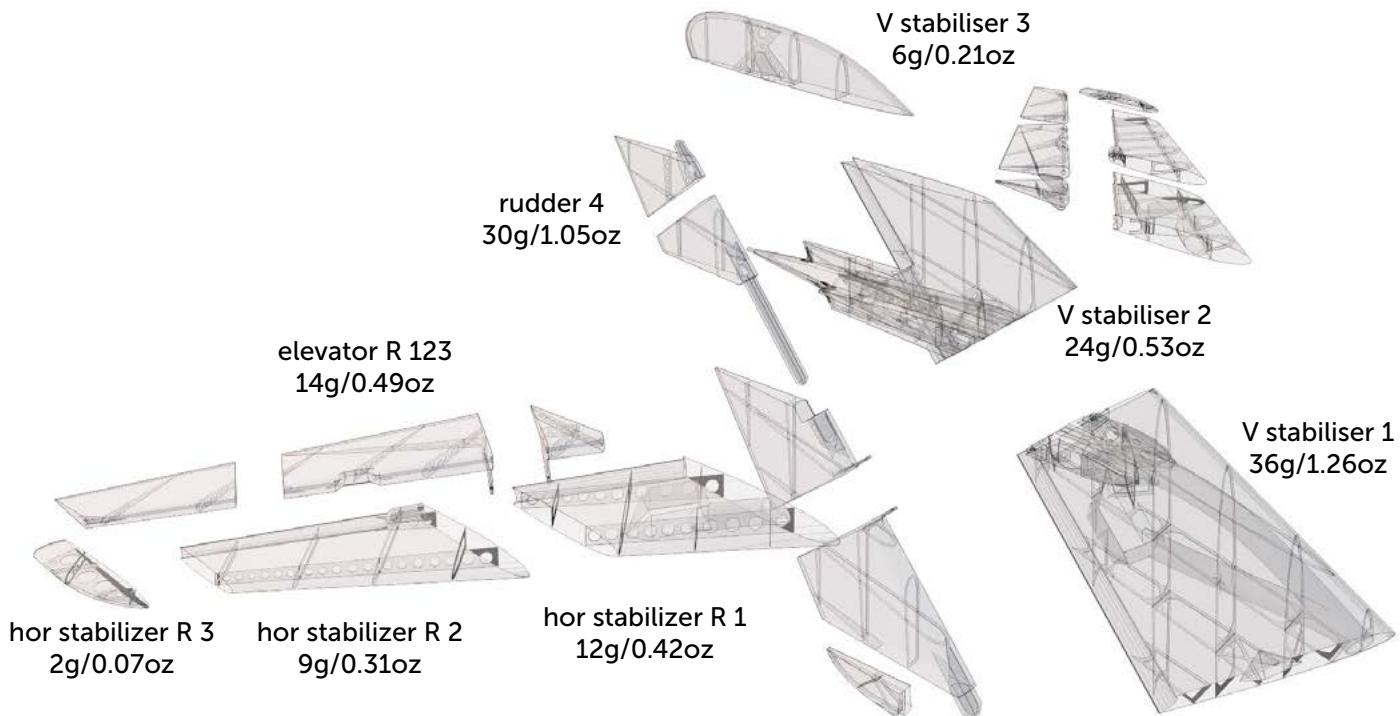
2x Hitec HS-81/82 or similar servos [Turnigy™ TR-1160A](#)

1 mm /14AWG pushrod wire or carbon rod

1,5 mm / 16 AWG pushrod wires

Wire cutter, Z bend pliers or pliers.

Snap knife



6.1 Landing gear - nose, main

Buy retracts, perfect fits [Full Metal Servoless Retract with Oleo Legs \(Tricycle, Mig 17 type\)](#) from Hobbyking. Unfortunately a nose side metal plate holders are wrong and you need one more correct from [Turnigy MCR All Metal Retract System \(Small\)](#) main gear. All other parts of this set are for further service your retracts. Will be fine have some spare parts during flying. Dismount nose leg, switch metal plate holders for correct ones, use printed arm at leg, use printed wheels. You will need extend cables for retracts. Mount front wheel servo and use thin steel wire for pull-pull system. Use the screws to hold the retracts. Test the functionality of pull-pull and retract closing. You can use OIL for better suspension friction.

NOTE: You can also use other retract but holes and bays are prepared for Hobbyking type.

[See video guide #8](#)

You will need:

[Full Metal Servoless Retract with Oleo Legs \(Tricycle, Mig 17 type\)](#)

[Turnigy MCR All Metal Retract System \(Small\)](#)

fitting screws

1x Hitec HS-65 MG or [HobbyKing™ HK15178 Analog Servo](#) or similar

[Coated Steel Wire 0.6mm \(5m/Bag\)](#)

[Coated Copper Crimping Tube for Pull/Pull Wire \(10pc\)](#)



7.1 Electro Ducted Fan propulsion system

Our Mig-15 was designed for 90mm EDF. We tested it with 6S Li-Pol and 2-2,5kg thrust, weight 300-400g. The use of more powerful drives has not been tested or designed. We do not take responsibility for using too powerful EDFs. Be careful with power.

Glue 10mm ring at intake chanell in fuselage T3. You can use hot wire or dremel for prepare EDF holder at fuselage. Mount your EDF, push it to output chanell well and use screws for perfect and strong fitting. Measure distance between intake chanell and EDF. Print correct length of cover ring. Cut off it and use cable binder for cover ring mounting. Test your power.

NOTE: Our Dr Mad Thrust arrived without holder and maybe you will need order it separately
[Mount strap for 90mm Alloy DPS Fan.](#)

[See video guide #9](#)

You will need:

- 90mm EDF for 6s Li-Pol, 2-2,5kg thrust, not so long body...
- [EDF unit with 1750kv Motor - 90mm \(recommended\)](#)
- [Dr Mad Thrust 11-Blade Alloy 90mm](#)
- or similar
- fitting screws



8. RC equipment and final assembly

Glue controller holder and mount it to fuselage. Install your receiver, connect battery, setup servos and etc. with your transmitter, check servo position. Set recommended deflection from videoguide. Check CoG point (see CG- tags on wings)

Make sure that the battery is placed properly and secured. If battery moves during flight it can shift the center of gravity backwards and aircraft will be uncontrollable!

[See video guide #10](#)

You will need:

Your own Rx/Tx system

2x 3S Li-Pol 2400mah used as serial for 6S

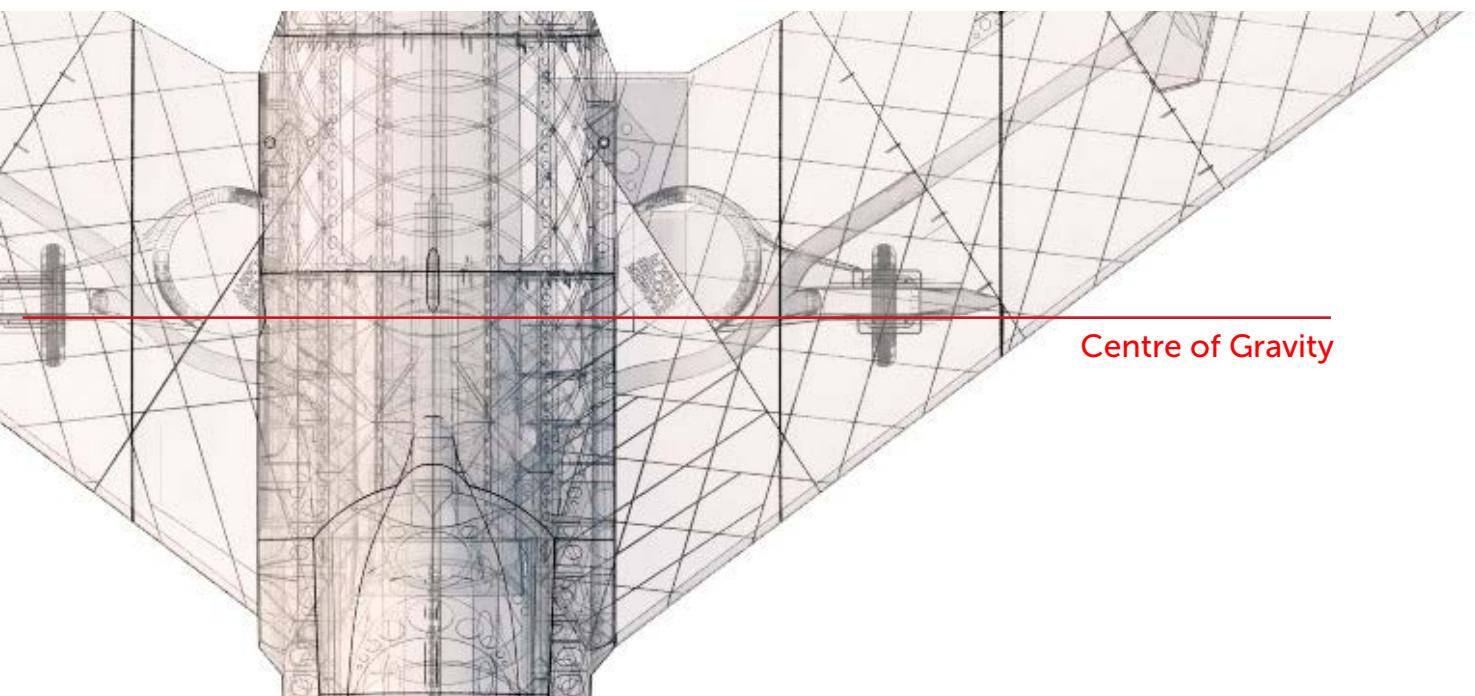
[Turnigy Bolt 2400mAh 3S 11.4V 65~130C High Voltage Lipoly Pack](#)

[80-100A Electronic Speed Controller](#)

Adhesive velcro strip for Li-Pol battery and ESC

Scale markings printed on adhesive foil

battery maximal profile:
25 x 35 mm
1 x 1,37 inch



10. Pilots Please Attention!

For the first flights we recommend to set the center of gravity of the airplane by about 5 mm forward of the CG tag - nose heavy, this increases the stability (you can use heavier battery). Also is good to increase expo settings on your transmitter for elevator and aileron to 60 % (this calms response from your stick inputs). Also you can decrease elevator and ailerons deflection.

Make sure the battery is well fixed in proper position. If it moves during flight it will cause the CoG move aft and can lead to uncontrollable flight behavior.

You can then return to the proper center of gravity (balance aircraft). Set expo to 30-50 % ... this will gain back extra maneuverability when you are confident with flying your airplane.

Spent at least 10 hours with RC flight simulator before you go out for the first time.

Flight test: RC Planes for beginners (but note: we use primary ailerons for turn, not only rudder)

Never fly aft positioned Center of gravity.

Please, use these files only for your own purpose, do not send it further. Thank you very much. Enjoy your flight.



Shopping list

Printing material:	2kg of PLA or PLA (Plasty Mladec We use) or any PLA... or experiment
RC:	8 chanell receiver by your RC system
EDF:	EDF unit with 1750kv Motor - 90mm Dr Mad Thrust 11-Blade Alloy 90mm Mount strap for 90mm Alloy DPS Fan or similar for 6S Li-Pol with not so long body, weight 300-400g
Controller:	80-100A Electronic Speed Controller
Battery:	2x 3S Li-Pol 2400mAh used as serial for 6S Turnigy Bolt 2400mAh 3S 11.4V 65~130C High Voltage Lipoly Pack
Servos:	2x Hitec HS-81/82 or similar servos Turnigy™ TR-1160A 3x Hitec HS-65 MG or HobbyKing™ HK15178 Analog Servo or similar 4x servo extension cables 300mm / 12 inch 2x servo extension cables 500mm / 20 inch 3x servo extension cables 800mm / 32 inch
Retracts:	Full Metal Servoless Retract with Oleo Legs (Tricycle, Mig 17 type) Turnigy MCR All Metal Retract System (Small) Coated Steel Wire 0.6mm (5m/Bag) Coated Copper Crimping Tube for Pull/Pull Wire (10pc)
Glue:	CA Glue - medium or similar medium viscosity CA glue Activator for CA Glue or similar,
Other:	1 mm / 14 AWG pushrod wire or carbon rod 1,5 mm / 16 AWG pushrod wire fitting screws