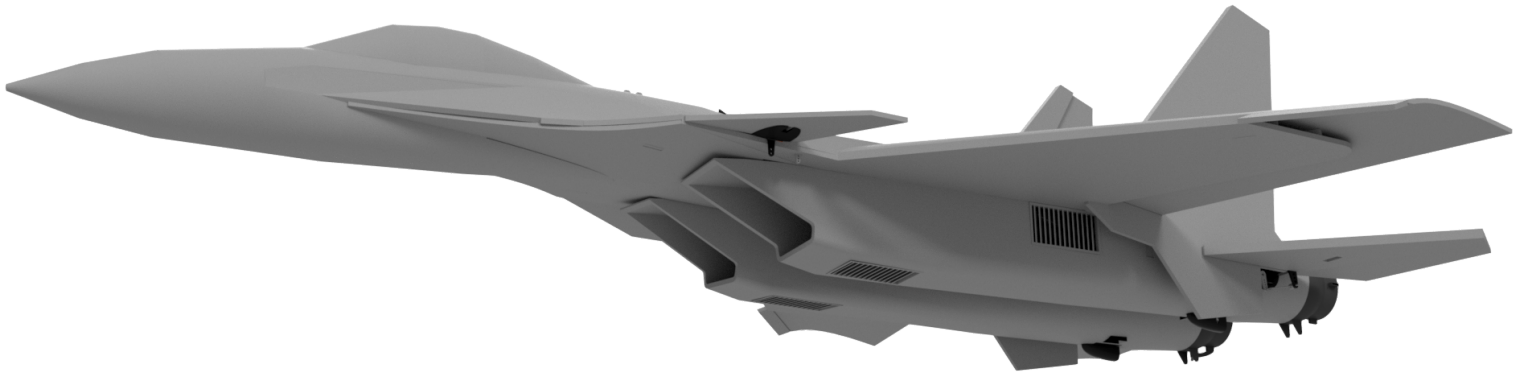
Twin-EDF SU-30 Thrust Vectored RC Jet



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Before you start

Intended audience

This SU-30 model is intended for intermediate / experienced builders with prior foam board scratch building experience and thus is not a good choice for a beginner builder. Regarding flying skills, this aircraft flies very stable and easy and doesn’t need an expert to fly it (If build well).

The images and videos I’ve shared of this aircraft shows only what can be made using these set of plans, but the actual outcome of your build depends completely on factors such as your building skills, materials and components being used and your ability to follow instructions.

General tips

This build has a lot of curved foam parts, so every brand of foam will not work. It’s recommended to use the Flite Test foam. Some other foam brand might or might not work and might be much heavier. For reference, a 20" x 30" Flite Test foam sheet weights 110g.

Regarding the power system, for the best performance use factory assembled dynamically balanced 12-blade fans with high enough C-rated batteries. Tip: Never disassemble factory balanced EDF units as they might not be the same after reassembling them.

Regarding the control system, use high quality metal gear servos. Low quality servos have higher backlash which greatly reduces the precision at which the aircraft can be controlled. Especially important if using the recommended all-moving stabilizers configuration.

The dRehmFlight flight stabilization code found in the plans directory is completely optional, this aircraft is passively very stable and doesn’t need any active stabilization to fly well.

Resources

The build instructions for this model is a time lapse video, it can be found here: (Work in progress). There are some forum threads of this aircraft and it’s predecessor, the SU-27, on Flite Test’s website and RCGroups:

- Thread about the development of this aircraft and it’s predecessor here:
- Thread about the community builds of this aircraft model and it’s predecessor here:
- Thread about this aircraft on RCGroups (Soon to be)

About the aircraft

Specifications

Specification	***Unit***	***Quantity***	***Comment***
Length	mm	1450	
Wingspan	mm	1000	
Target weight	g	1900-2400	Depends on configuration
CG position (from nose)	mm	820	
Power setup	LiPo Cell	4-6	6 cell is heavier but more powerful
Static thrust	g	2600	(4 cell setup)
Thrust/weight ratio	-	~ 1.35-1.1	Depends on configuration and power setup
Max current consumption	A	~ 120	
Max power	W	~ 1800	(4 cell setup)

Table 1: Specifications

Functions

Table 2 shows the configurable functions of the SU-30. For all 3 functions on the table, you can choose between the “main method” (what the plane was designed for) and the alternative method.

Function	***Main method***	***Alternative method***
Stabilizers	All-moving	Static + elevon
Nozzles	Thrust vectored	Static
Canards	Static	Movable

Table 2: Configurable functions

Parts list

Item	*Nominal quantity*	*Add for thrust vectoring*	*Add for moving canards*	*Comment*
		Power Setup		
70mm 12-blade EDF unit	2	-	-	Dynamically balanced
ESC 60-80A	2	-	-	Designed for 60, 80 for being safe
4 / 6 Cell battery	1	-	-	4-6 Ah, 30+ C load rating
14g metal gear servo	2	4	2	Size 23 x 12 mm
BEC / Buck converter 6v 3A	1	-	-	If using more than 2 servos
RC Receiver, 4+ Channel	1	-	-	
		Wires		
Red, 5mm^2 (10AWG)	100cm	-	-	Silicone insulated
Black, 5mm^2 (10AWG)	100cm	-	-	
Servo extension wire 60 cm	2	4	-	
Servo Y-cable	1	1	1	
		Hardware		
Linkage stopper	2	4	2	
Stainless steel wire, 1.5 mm	120mm	-	120mm	a.k.a. spring steel rod, piano wire etc...
M2 Threaded rod	-	500mm	-	
M2 Ball linkage	-	4	-	
2x8mm servo screw, self tapping	5	8	4	
M4 x 65 Hex socket screw	2	-	-	a.k.a. machine screw, DIN912 etc...
M3 x 35 Hex socket screw	-	-	2	
		Miscellaneous		
Foam sheet 762x508 mm (“20”x30”)	8	-	-	Flite Test foam recommended
Thrust vectoring unit 70 mm	-	2	-	
3D printed parts	1	-	-	
Velcro straps	2-6	-	-	Depends on your build
Thread lock!	1	-	-	For linkage stoppers
A3 Poster board / strong paper sheet	2	-1	-	For thrust tubes
30 min epoxy	1	-	-	
Hot glue	Plenty	-	-	

Table 3: Parts list

Plans interpretation

Lines

The line colors and styles are explained in figure 1 below.

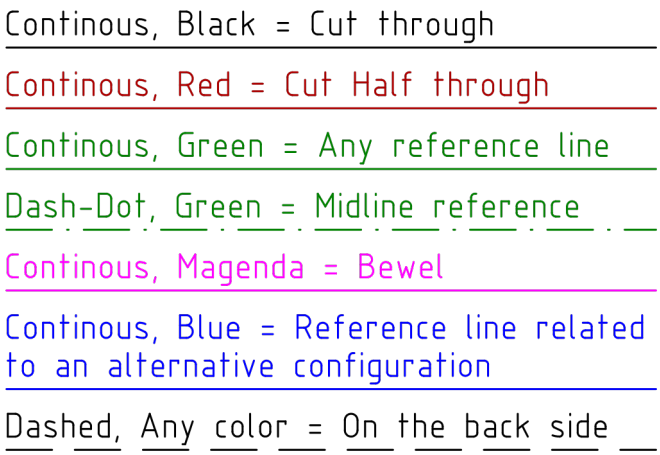

Figure 1: Line colors and styles

Arrows

Green arrows indicates two things: Arrow in front of the part indicates the front edge, i.e. the direction of the part.

Green arrow between two red lines indicates the line around which the part is folded, as illustrated in figure 2.

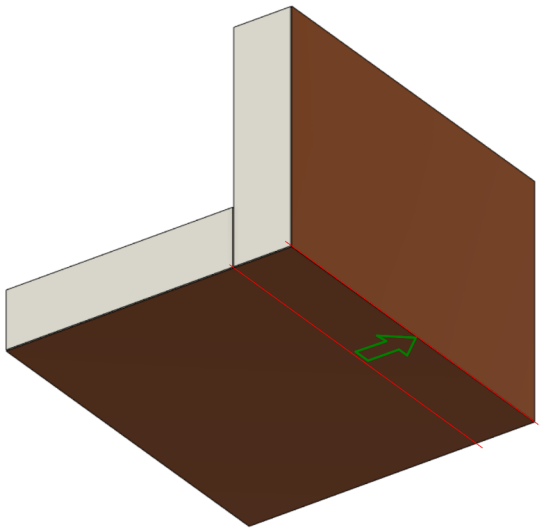

Figure 2: Fold line indication

Part naming convention

The more obvious parts are named literally, for example “Wing Top“ or “Canard”.

The less obvious parts are named with an unique index, for example “F2SA”. Here is what it means:

The first character (letter) refers to the section of the aircraft the part belongs to:

- F = Fuselage
- W = Wing
- E = Engine
- C = Canopy
- T = Tail

The second character (letter) indicates the type of the part.

- F = Former (Any structural piece)
- S = Skin

The third character (number) is a sequential number indicating the location of the part. This number starts at 1 in front of the aircraft and increases towards the rear of the aircraft. For example “FS1”, “FS2” and “FS3” are the three first fuselage skin pieces.

Some parts are divided into A and B parts, hence the (rarely used) fourth letter in the part index.

3D Printed parts

Material

Regular PLA works just fine, but for maximal weight savings you can use ABS and foaming light weight PLA. Just don’t use LWPLA on the stabilizer / canard mechanisms since those are absolutely crucial structural parts.

Print orientation

Print orientation of each part is shown in figure 3.

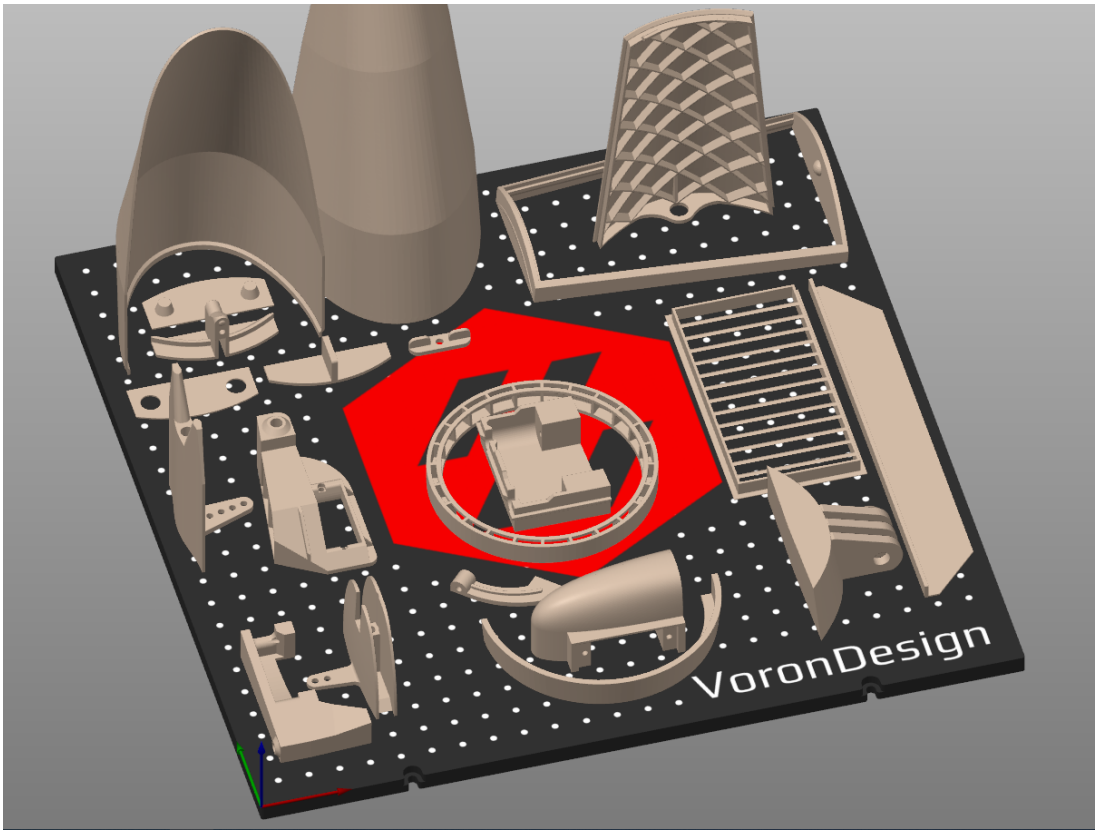

Figure 3: Print orientation

Printing tips

- Depending on your build plate adhesion a brim is most likely needed on some parts.
- Mirrored parts are not included in the files. "+M" in the file name means a mirrored part is also required.

Closing words

I’m doing these projects as a hobby on the little spare time I have from my university studies, thus the progress is very slow sometimes. Regardless of that, I’m going to update these plans if necessary, so if you catch a bug or have any suggestions for improvements, please let me know.

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For contacting me, for any reason, you can do so at *meyerflitedesign@gmail.com* or through any forum thread.