

**Calculation attempt # 1**

Rough calcs for the VTOL 4kg payload delivery plane 4 kg Using 70mm EDF's from Banggood

Estimated chassis weight 2.5 kg

24 Volts 64 Amps 1536 Watts

For the [https://www.banggood.com/FMS-70mm-6S-12-Blades-Ducted-Fan-EDF-Unit-With-2860-1850KV-Brushless-Inrunner-Motor-p-1115122.html?rmmds=search&cur\\_warehouse=CN](https://www.banggood.com/FMS-70mm-6S-12-Blades-Ducted-Fan-EDF-Unit-With-2860-1850KV-Brushless-Inrunner-Motor-p-1115122.html?rmmds=search&cur_warehouse=CN)  
 70mm EDF with about an 80A esc Estimated thrust each 2 kg or ~ 19.6 N

EDF Mass 0.24 kg

ESC Mass 0.066 kg

Mass together 0.306  
 4 times 1.224 kg 8 kg or ~ 78.4 N

Flight power at 100% 6144 Watts  
 256 Amps running at 24 Volts

Flight at 50.00% Power = 3072 Watts  
 128 Amps Not correct I know, but we're roughing it out here

Most EDF jets (according to RC groups) do around 160 kph  
 For a 1 hour flight remove a bit for VTOL actions say 50 km range

Say a [https://www.banggood.com/5.2Ah-3S-LiPo-Battery-p-1115122.html?rmmds=search&cur\\_warehouse=CN](https://www.banggood.com/5.2Ah-3S-LiPo-Battery-p-1115122.html?rmmds=search&cur_warehouse=CN) battery pack

is 5.2 Ah

weight 0.78 kg

We need 24.6 batteries

Total weight 19.2 kg

Which all of a sudden blows the whole idea out of the water.  
 That makes a plane of 22.924 kg plane with only 8 kg of thrust for VTOL ~~~~

To make it fly VTOL with 4 of payload we need to keep everything und 4 kg

With 1 battery pack  
 4.504 kg base plane weight with -0.504 kg to spare.

Sheet1

total fly time 2.4375 minutes of flight  
 Probably a touch more if bugger all VTOL  
 Best distance in 2.4375 minutes is 6.5 km one way or  
 3.0 km'ish with VTOL

So say 30.00% safety margin  
 2.1 Km flight range with a 4 kg payload

Cost	Units	\$ each	Totals
70mm EDF and ESC	4	200	800
Lipo 6S 5.2Ah	1	120	120
Flight controller	1	70	70
Long range TX and VTX equ	1	400	400
Airframe	1	300	300

Total cost 1690

*Other costs*  
 Engineering time  
 CASA fees  
 Pilotage

**Calculation attempt # 2**

Rough calcs for the VTOL 4kg payload delivery plane 4 kg Using 120mm EDF's from xtremehobby in Brisbane  
 Estimated chassis weight 5 kg

44 Volts 80 Amps 3520 Watts

For the <http://www.xtremehobby.ashop.com.au/p/1213342/lander-120mm---ledf120-1a83--motor830kv-12s-edf.html>  
 120mm EDF with about an 80A esc Estimated thrust each 5.7 kg or ~ 55.86 N

Sheet1

EDF Mass 1.01 kg  
ESC Mass 0.066 kg

Mass together 1.076  
4 times 4.304 kg 22.8 kg or ~ 223.44 N

Flight power at 100% 14080 Watts  
320 Amps running at 44 Volts

Flight at 50.00% Power = 7040 Watts  
160 Amps Not correct I know, but we're roughing it out here

Most EDF jets (according to RC groups) do around 160 kph  
For a 1 hour flight remove a bit for VTOL actions say 50 km range  
Say a <https://www.battery pack>  
is 5.2 Ah  
weight 1.56 kg  
We need 30.8 batteries  
Total weight 48 kg

Which all of a sudden blows the whole idea out of the water.  
That makes a plane of 57.304 kg plane with only 22.8 kg of thrust for VTOL ~~~

To make it fly VTOL with 4 of payload we need to keep everything und 18.8 kg

With 5 battery pack(s)  
17.104 kg base plane weight with 1.696 kg to spare.  
total fly time 9.75 minutes of flight

Probably a touch more if bugger all VTOL  
Best distance in 9.75 minutes is 26 km one way or  
**11.8 km**'ish return trip with VTOL

So say 30.00% safety margin

Should be able to get higher airspeed then this though.

**8.3** Km round trip flight range wit 4 kg payload

Cost	Units	\$ each	Totals
120mm EDF and ESC	4	579	2316
Lipo 6S 5.2Ah	5	240	1200
Flight controller	1	70	70
Long range TX and VTX equ	1	400	400
Airframe	1	800	800
Total cost			4786