For note keeping and documenting decision making processes now, will formalize later.
Current is in amps
Efficiency in %
Thrust is in oz

Badass 560kv motor:

Current draw at Cruise for Badass 560 12x10: 5.1
Current draw at Cruise for Badass 560, 13x10: 5
Current draw at Cruise for Badass 560, 14x10: 4.7
Current draw at Cruise for Badass 560, 14x12: 4.5

Efficiency at Cruise for Badass 560, 12x10: 53.6
Efficiency at Cruise for Badass 560, 13x10: 53
Efficiency at Cruise for Badass 560, 14x10: 51.6
Efficiency at Cruise for Badass 560, 14x12: 55.5

Lowest current draw: 14x12 @ 4.5
Highest Efficiency: 14x12 @55.5

Badass 650kv motor:

Current draw at Cruise for badass 650, 12x10: 5.1
Current draw at Cruise for badass 650, 13x10: 4.7
Current draw at Cruise for badass 650, 14x10: 4.4
Current draw at Cruise for badass 650, 14x12: 4.9

Efficiency at Cruise for badass 650, 12x10: 54.2
Efficiency at Cruise for badass 650, 13x10: 53.6
Efficiency at Cruise for badass 650, 14x10: 51.5
Efficiency at Cruise for badass 650, 14x12: 57

Lowest current draw: 14x10 @4.4
Highest Efficiency: 14x12 @57

Badass 710kv motor:

Current draw at Cruise for Badass 710kv, 12x10: 4.8
Current draw at Cruise for Badass 710kv, 13x10: 4.8
Current draw at Cruise for 14x10, 14x10: 4.9
Current draw at Cruise for Badass 710kv, 14x12: 4.5

Efficiency at Cruise for Badass 710kv, 12x10: 56
Efficiency at Cruise for Badass 710kv, 13x10: 55.8
Efficiency at Cruise for 14x10, 14x10: 55.4
Efficiency at Cruise for Badass 710kv, 14x12: 57.3

Lowest current draw: 4.8 @12x10&13x10
Highest Efficiency: 57.3 @14x12

Hacker A30-10XL v4 motor:

Current draw at Cruise for Hacker 900kv, 12x10: 5.2
Current draw at Cruise for Hacker 900kv, 13x10: 4.8

Current draw at Cruise for Hacker 900kv, 14x10: 5.2
Current draw at Cruise for Hacker 900kv, 14x12: 5.2
Current draw at Cruise for Hacker 900kv, 15x8: 4

Efficiency at Cruise for Hacker 900kv, 12x10: 54.2
Efficiency at Cruise for Hacker 900kv, 13x10: 53.3
Efficiency at Cruise for Hacker 900kv, 14x10: 53.5
Efficiency at Cruise for Hacker 900kv, 14x12: 55.9
Efficiency at Cruise for Hacker 900kv, 15x8: 37.9

Lowest current draw 15x8 @ 4
Highest Efficiency 14x12 @ 55.9

Badass 790kv motor:

Current draw at Cruise for badass 790, 12x10: 5.1
Current draw at Cruise for badass 790, 13x10: 5.2
Current draw at Cruise for badass 790, 14x12: 5.8
Current draw at Cruise for badass 790, 15x8: 4.5

Efficiency at Cruise for badass 790, 12x10: 51.2
Efficiency at Cruise for badass 790, 13x10: 51.1
Efficiency at Cruise for badass 790, 14x12: 55.1
Efficiency at Cruise for badass 790, 15x8: 34.3

Lowest current draw: 15x8 @4.5
Highest Efficiency: 14x12 @55.1

Badass 970kv motor:

Current draw at Cruise for badass 970, 12x10: 5.4
Current draw at Cruise for badass 970, 13x10: 5.5
Current draw at Cruise for badass 970, 14x10: 5.3
Current draw at Cruise for badass 970, 14x12: 5.5
Current draw at Cruise for badass 970, 15x8: 5.2

Efficiency at Cruise for badass 970, 12x10: 48.4
Efficiency at Cruise for badass 970, 13x10: 48.5
Efficiency at Cruise for badass 970, 14x10: 47.4
Efficiency at Cruise for badass 970, 14x12: 50.8
Efficiency at Cruise for badass 970, 15x8: 34.2

Lowest current draw: 15x8: 5.2
Highest Efficiency: 14x12 @ 50.8

So the 560 kv with a 14x12 seems to have the best numbers, although the 650kv with a 14x12 doesn't seem too bad either just because it has higher efficiency even though It has a higher current draw.

If we compare at full throttle at cruise speed of 45 mph:

Current draw at Cruise for Badass 560kv, 14x12: 24.5

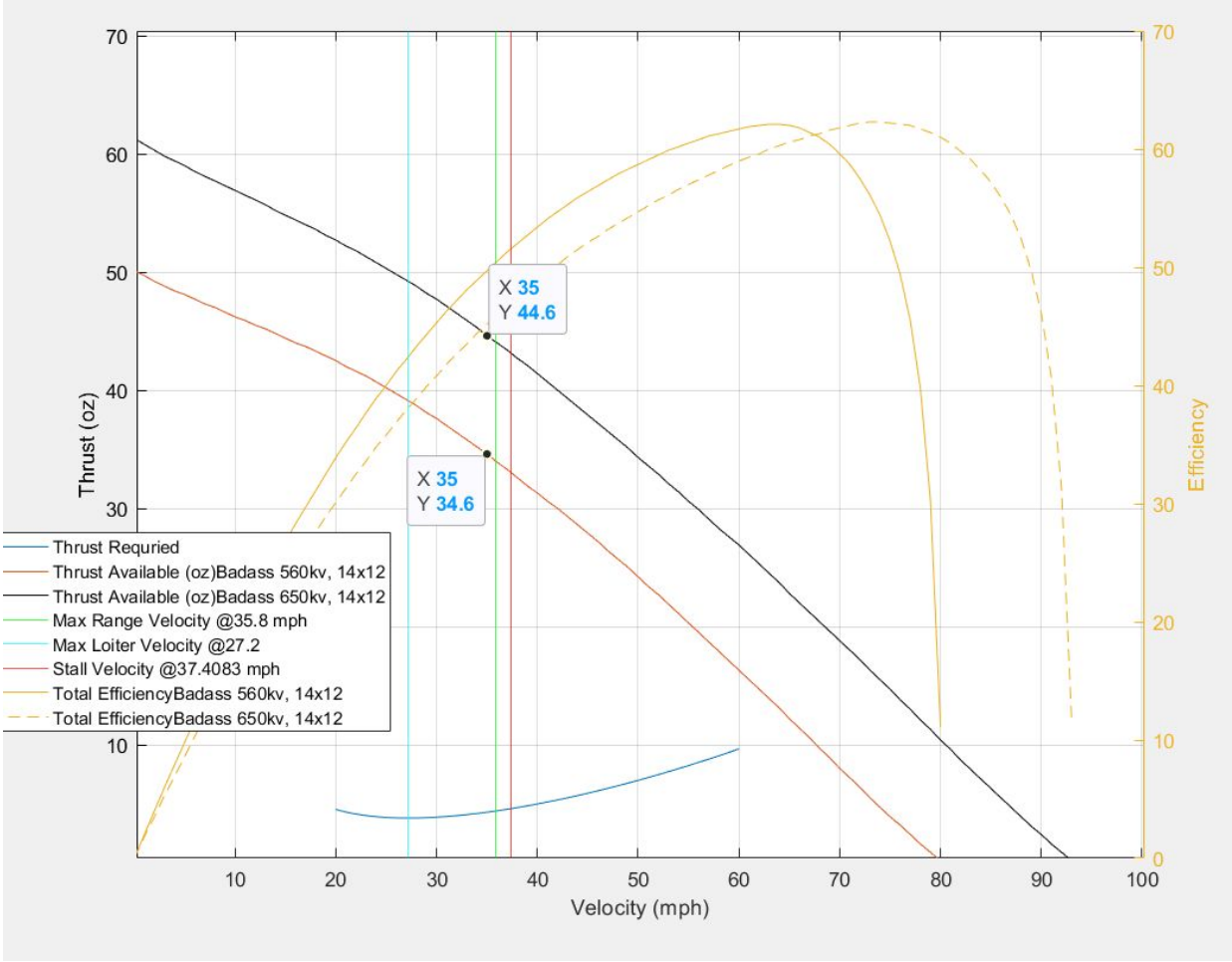
Current draw at Cruise for Badass 650kv, 14x12: 36.3

Efficiency at Cruise for Badass 560kv, 14x12: 56.9
Efficiency at Cruise for Badass 650kv, 14x12: 52.6

Max thrust at cruise for Badass 560kv: 27.9 oz
Max thrust at cruise for Badass 650kv: 37.9 oz

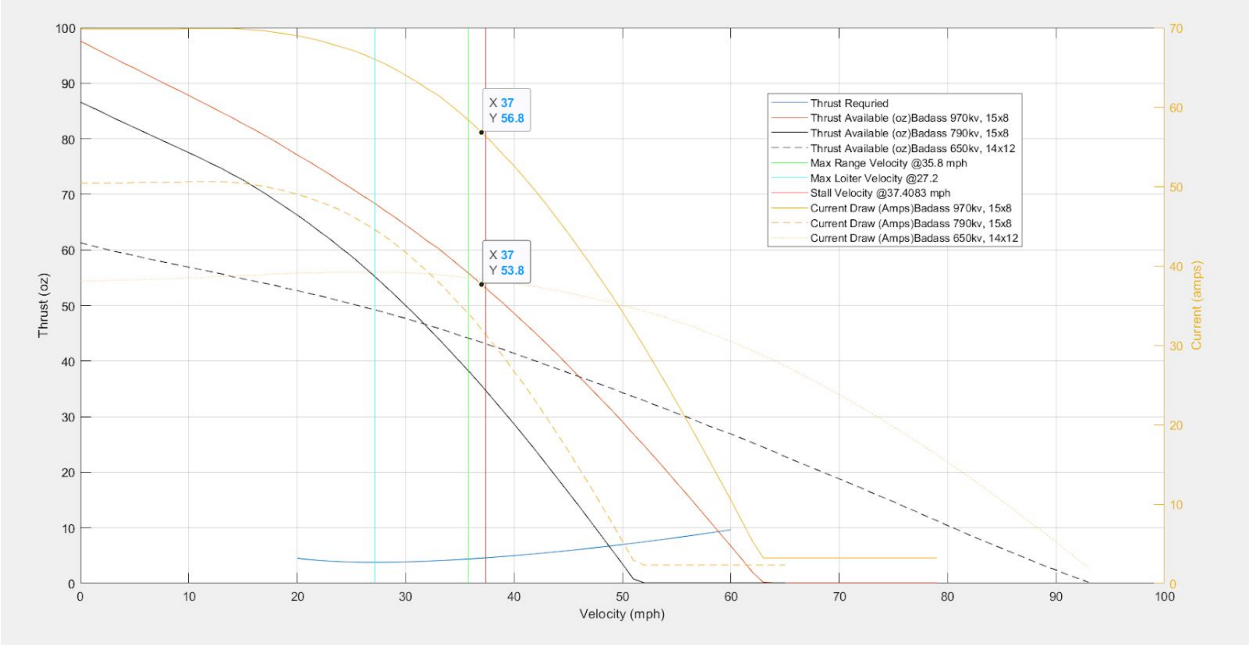
So I think if I were to pick between these two I'd pick the 650 because the excess thrust at cruise velocity is higher.

If we compare at full throttle at stall speed of ~37 mph:



We have 44 oz vs 34 oz. This means at stall we have a thrust to weight ratio of less than 1 for either case.

So given that the launch rail accelerates us to 37 mph, these will work. If we want to maximize the thrust output at stall and takeoff, we could use the 15x8 prop with the 970 kv motor. This has the highest thrust output out of any of the options



Compared with a 790 with the same prop as well as the most efficient prop and motor combo, we get a thrust output at full throttle at 37 mph to be ~54 oz, which brings us to 3.375 lbs/lbs. If we use this combo, our current draw at takeoff is going to be 56 amps. This prop also limits our top speed to a little under 60 mph. This combo also has the lowest efficiency and not a ridiculous current draw at cruise (5.2 amps), If we use this combo, we would need the neuron 80 amp ESC or the hobbyking 100 amp esc.

If I wanted to pick a combination that allows more wiggle room during takeoff, I'd pick the 970 and 15x8.

Team agrees that 15x8 with 970 should be picked, just because it has significantly more excess thrust during takeoff, which could be important if the launch rail doesn't accelerate us to 37 mph. I need to order more 15x8 props, I think specifically folding props just in case we break the one 15x8 prop we have.