



This acts as our preliminary circuit diagram with all necessary electrical components. We have 1 speed controller, 2 dc motors, 2 batteries with $\approx 2200\text{mAh}$ and $>1000\text{mAh}$ at 14.8V , 5 servo motors to control ailerons, elevators and ruder respectively and the receiver/transmitter housing. The 2200mAh battery will power the motors and speed controller only, while the extra 1000mAh battery will power every other component, this is required by the competition as a safety concern that would allow us in the event of emergency to return the plane to the ground without the motor systems. As for power draw, we look at the battery's capacity and outputting capabilities.

For the dc motors we can simply combine their total power loads and usages as they will be at the same speed/rpm. Using the **BadAss 4520-830Kv Brushless Motor** it has a maximum power output of 1630W , for a max total power draw between two motors of 3260W , calculating the amperage needed with a 14.8V battery results in 220270.2703mA , with a 2200mAh battery we have just over 7920000mAs to use. We will have about 35.9seconds or battery life if we are at maximum power in each motor. This is not enough time for the competition so either these motors will be underpowered, or another motor will be used.

For our designs we need our battery to last for 60 seconds at with a 2200mAh battery our max power draw should be no more than 1950W at 132A which is achievable with a 60C lipo battery.

As for the servos and receiver system, if we estimate that they will need 4.8V to 6V to run, using 6V and 2A for all 6 servos and 1 receiver which is worst case scenario where each servo is being used at once then the total power is 84W as there is 14A of current draw at 6V. The battery will see a current draw of about 4.05A total at 14.8V. For battery selection a

	Propulsion System	Control System
Max Power (W)	978.6	72
Max Current (A)	66	4.05
Voltage (V)	14.77272727 (We'll use 14.8V)	17.7 (we'll use 6)
Capacity (mAh)	2200	1000
Time till dead(s)	60	240

For selection of components

Motors(each):

Voltage (V)	14.8
Current (A)	110
Power (W)	1628

Servos(each):

Voltage (V)	6
Current (A)	2
Power (W)	12

Receiver:

Voltage (V)	6
Current (A)	2
Power (W)	12

Battery:

Capacity (mAh)	2200	1000
Voltage (V)	14.8	6

C Rating	60	5
Max Current (A)	132	5

*C rating is used to find max current draw (Capacity(Ah) * C rating) = (Max Current(A))