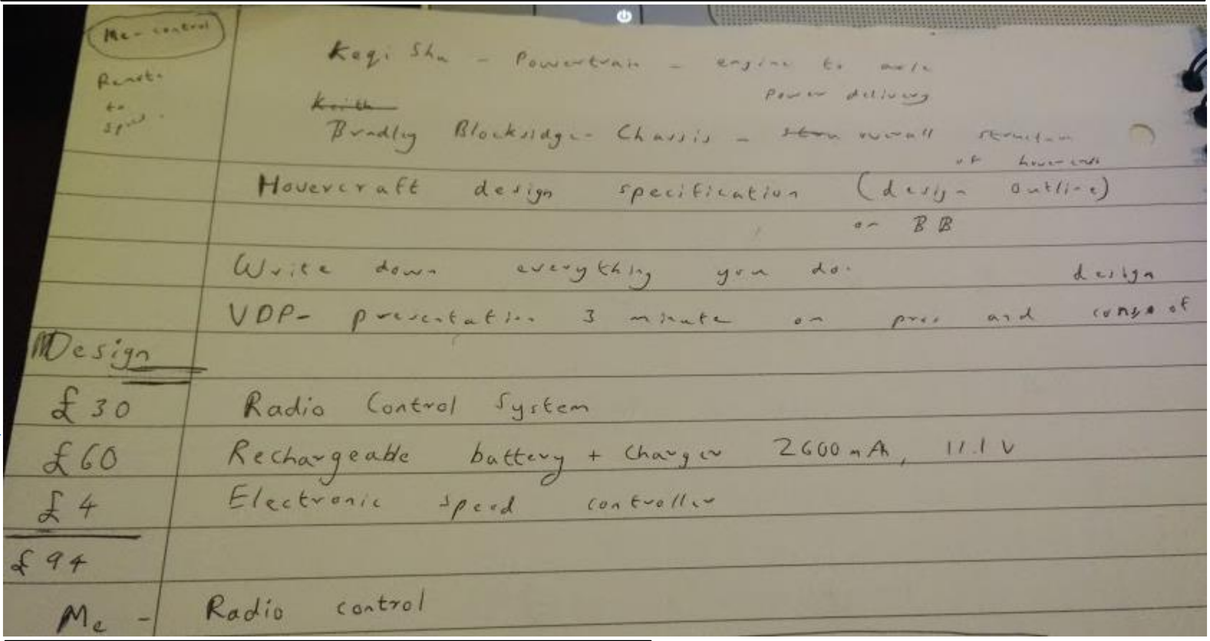
This is the initial notes on the roles of other team members who I'll have to work closely with. There are also some information about the initial cost estimation for my role



The price of each electronic equipment that I'll need to purchase for the minimum performance of the hovercraft is taken into account. The prices were taken directly from the blackboard site for the module. This was an initial estimate and has since changed.

The more up to date estimate is to the right:

Price	Equipment Name
£30	Radio Control System
£60	Rechargeable battery and charger
£4 **x 2** = £8	Electronic Speed Controller (ESC) **x2**
£94	

Electronic Speed Controller Eagle-20A	FOR USE WITH BRUSHED MOTORS ONLY. WILL NOT WORK WITH BRUSHLESS MOTORS	Cont Current: 20A	
		Burst Current: 25A	
		BEC Mode: 5v/1A	Battery eliminator circuit (BEC)
		Size: 45x21x8mm	
		Weight: 17g	
Ideal Motor Voltage	12V	Supply: 12V	
Battery to ESC supply	5V	Supply: 5V	

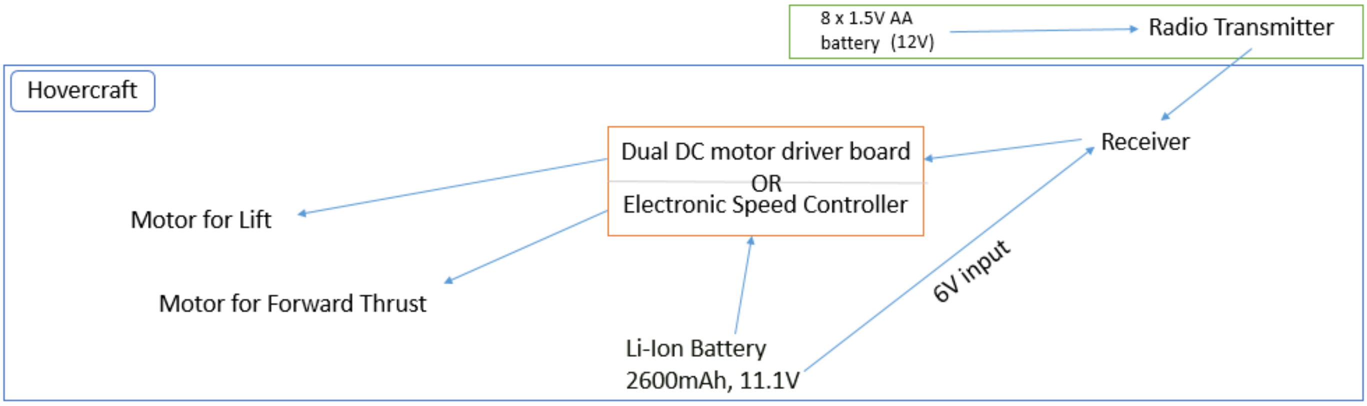
An online document to track the electrical & technical specifications of equipment's that could be used in the hovercraft design.

https://docs.google.com/spreadsheets/d/1ixjO9tZKks7eivinseuBxZE

Electrical & Control Systems Engineer – Divine Abraham

The Hovercraft will need either 2 Electronics Speed Controllers, one for the Lift & one for Thrust (Total of £8) or a Dual DC motor driver board (£3.74+)

Specification:	Electronics Speed Controllers	Dual DC motor driver board
Control Speed	Pulse Width Modulation	Pulse Width Modulation
Brake	Yes	No
Low Voltage Protection Threshold	Yes	No
Over-heat protection:	Yes	No
Throttle signal loss protection	Yes	No

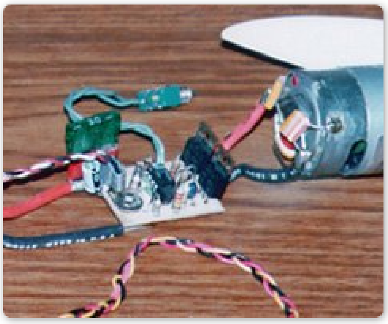


This was my VDP1 Meeting Presentation Slide. It goes through the various options that I've as the electrical engineer, this was a very basic initial design concept.

http://www.stefanv.com/electronics/escprimer.htm

Speed Control Fundamentals

Early electric R/C car speed controls consisted of nothing more than a hefty variable resistor, the wiper of which was moved by a servo. This had the advantage of being simple, but was very inefficient at partial throttle settings. Such a control works by reducing the voltage to the motor, but this means that any voltage that does not appear across the motor terminals must appear across the speed control. For example, at half throttle, a resistor speed control that is controlling a motor drawing 10A from a 6-cell pack will have 3.6V across it, and 10A flowing through it. From our second law, that's 36W, which all becomes useless heat. This would be like running a 40W light bulb in the radio compartment of your plane. Furthermore, half the power being produced by the battery is being wasted. A resistor speed control is only efficient at zero throttle (when no current is flowing), and at full throttle (when there is no voltage drop across the speed control).



A typical (in 1997) high-rate analog speed control connected to a Graupner Speed 600 motor. Notice the fuse in the positive lead from the battery connectors.

An *electronic* speed control (the photo shows a typical high-rate speed control) works by applying full voltage to the motor, but turning it on and off rapidly. By varying the ratio of on time to off time, the speed control varies the *average* voltage that the motor sees. Since at any given instant, the control is either fully off (no current flowing, so $P = 0 \times V = 0$W) or fully on (no voltage drop across the speed control, so $P = I \times 0 = 0$W), this kind of control is *theoretically* 100% efficient.

This website was used to get some basic understanding and applications of the Speed Controller. It had lots of useful and self-explanatory math formulas to improve the initial understandings.

Other References Used:

http://www.rcmodelswiz.co.uk/rc-guides/electric-rc-models-guide/electronic-speed-controllers-esc/

https://dronesandrovs.wordpress.com/2012/11/24/how-to-control-a-brushless-motor-esc-with-arduino/

http://bestpriceonline.co.uk/5v-12v-adjustable-voltage-dual-bec-output-board-esc-distribution-connection-board/