

2224559

by Mohammed Ibrahim

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PROJECT PRESENTATION

BY ZEESHAN IBRAHIM

DRONE INDUSTRY BACKGROUND AND PROBLEM DEFINITION

Where are they used?

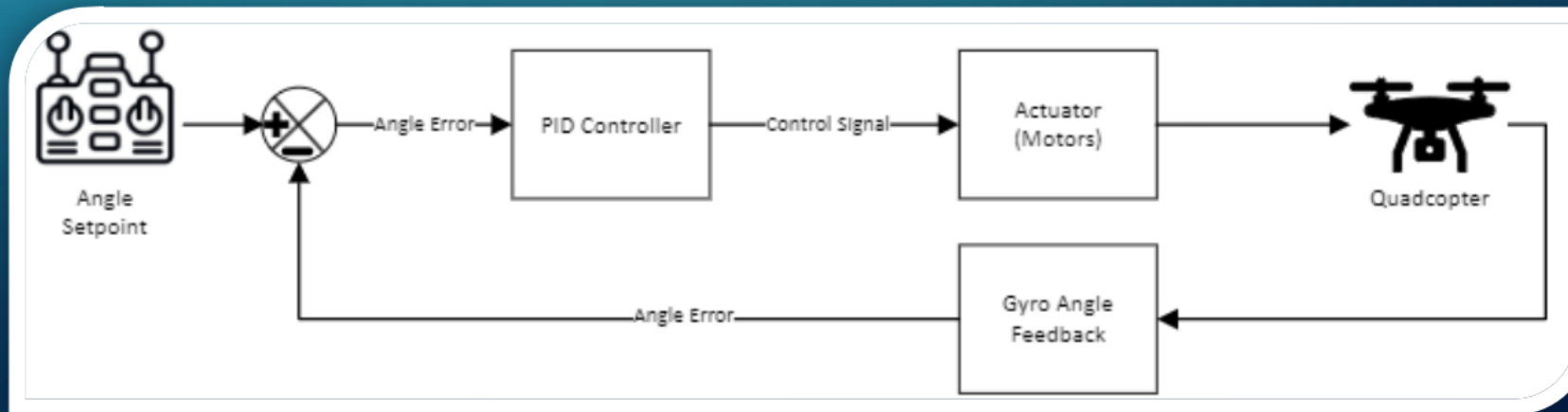
- Firefighting
- Videography
- Delivery services
- Racing

Problem – Current drone isn't built to a racing specification.



PROJECT AIM

- To design and build a drone which functions as a closed loop system.
- To be a fast system using PID control.
- Must be capable of winning racing events around the UK, which requires a certain specification of parts.
- Must be radio controlled and send live video data to the pilot.



FUNCTIONAL SPECIFICATION

- Speed controller receives inputs from flight controller board.
- DSHOT protocol to communicate and control motors with MOSFET switching.
- Control 4 motors (1 ESC per motor).
- Use RPM filtering if necessary.

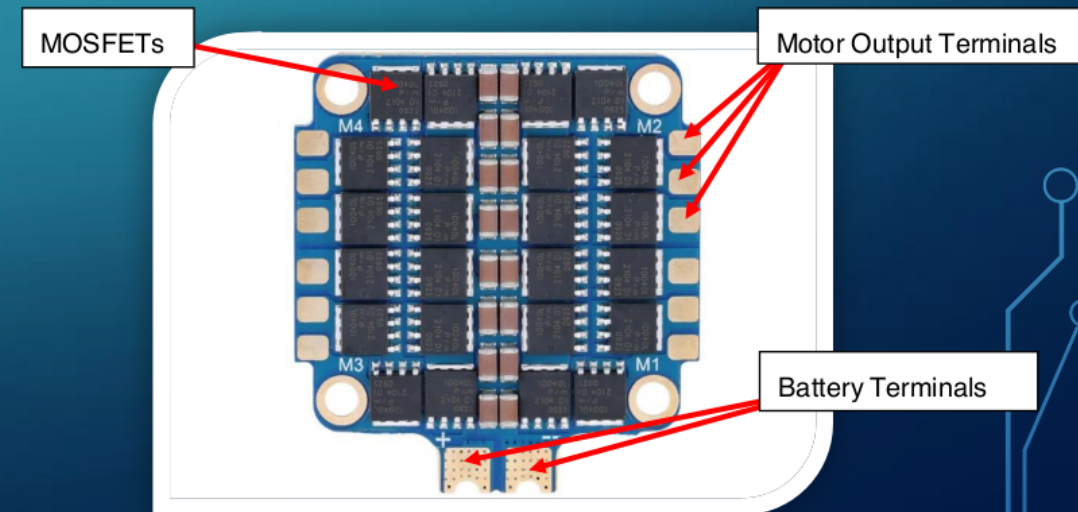
SOLUTION 1 – BLHELI_32 4 IN 1 ESC

Advantages:

- Easy to work with. Small amount of wiring.
- Uses a 32bit processor and BLHeli_32 software which grants extra functions.

Disadvantages:

- Costs the whole board to replace if 1 ESC fails.
- Drone requires full disassembly to replace board.



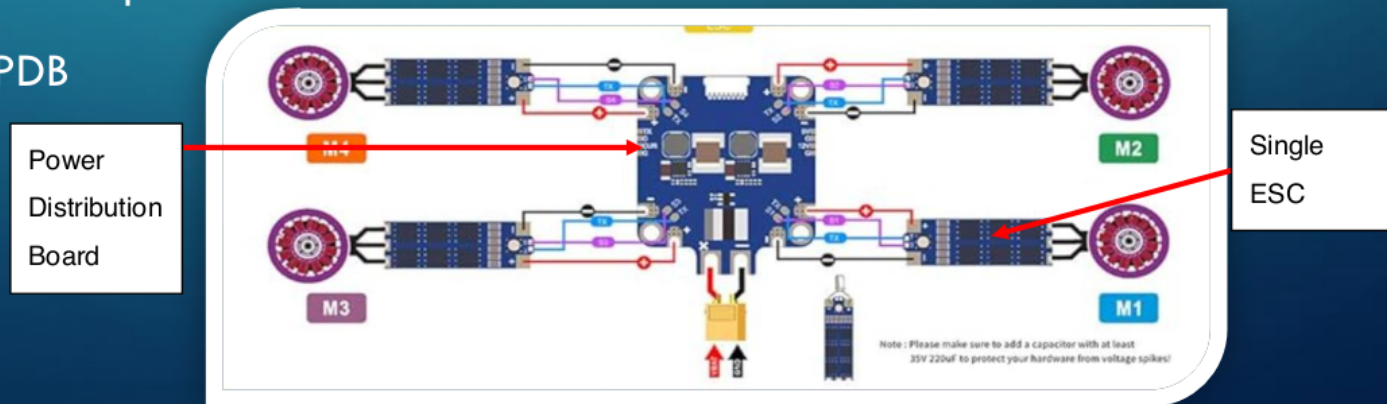
SOLUTION 2 – BLHELI_S SINGLE ESC

Advantages:

- Easy to replace if one fails and cheaper.
- Less subject to overheat due to mounting position.

Disadvantages

- Uses a 16 bit processor and BLHeli_S software, which requires extra steps to use extra features.
- Less common to purchase
- Requires PDB



COMPARING AND CHOOSING A SOLUTION

	Solution 1	Solution 2
Software	BLHeli_32	BLHeli_S
Capacity	66A	45A
PDB	No	Yes
Cost	£57.20	4x £12.84 1x £12.99 Total = £64.35
Mounting	Under flight controller in centre.	Drone arms.

Solution 1 was chosen. The reasons are:

- Easier and less time consuming to wire.
 - Uses better software.
 - Cheaper than solution 2.

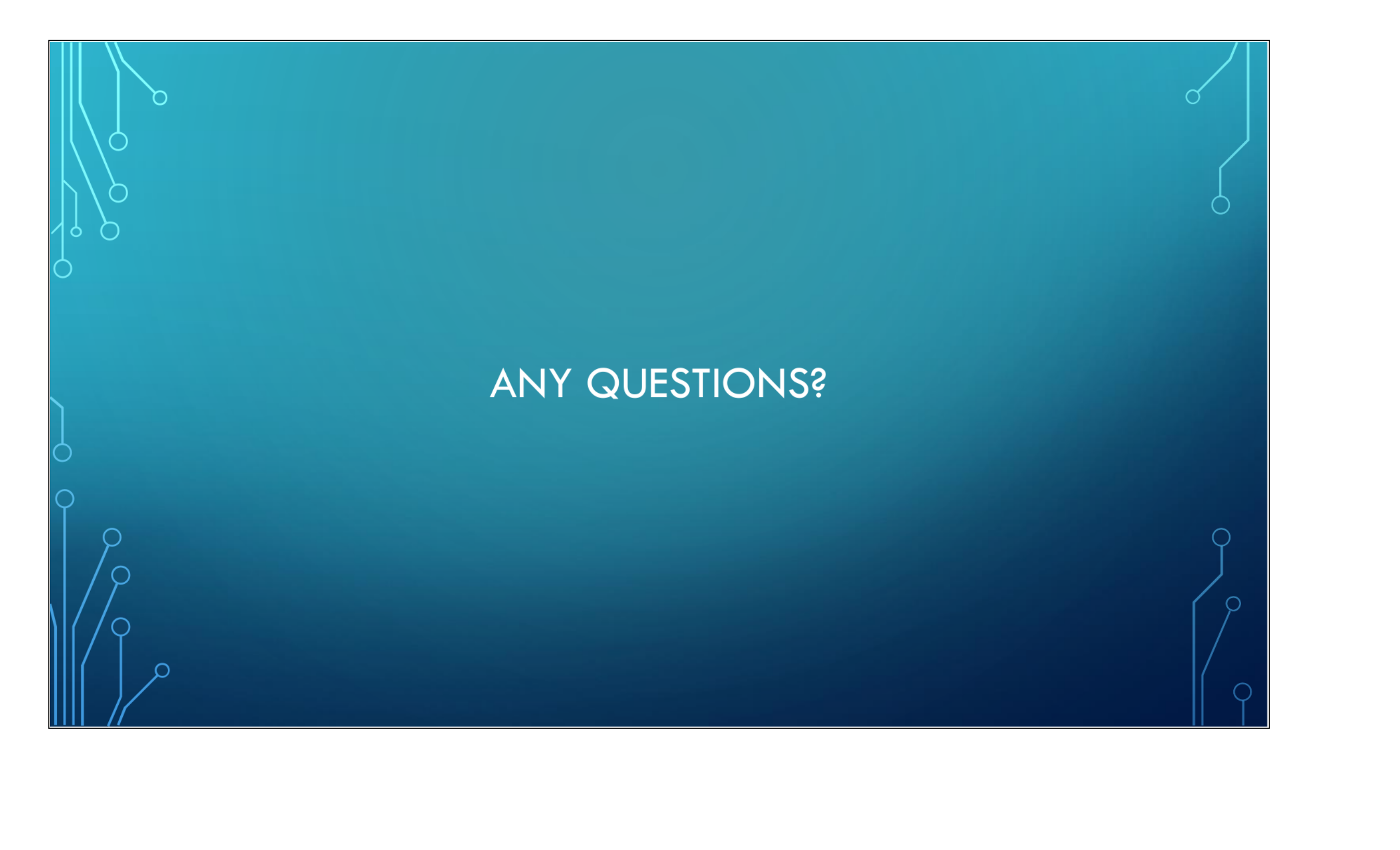
Overall cost - £355.70 excluding
radio transmitter and goggles.

PROJECT TIMELINE



TESTING PLAN

Test Number	Description
1	Wiring check before first power up
2	Input channel mapping
3	Video transmitter output power and 5.8GHz channel accuracy
4	Motor mapping and failsafe
5	PID test
6	PID and filter tune test

The background is a teal-to-blue gradient. In the four corners, there are white line-art patterns resembling circuit boards or neural networks, with lines and small circles connecting them.

ANY QUESTIONS?

FINAL GRADE

GENERAL COMMENTS

82/100

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MOHAMMED IBRAHIM

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RESEARCH-INFORMED LITERATURE

- ✎ Extensive amount of research carried out which is evident in the slides and the explanations. 8.5/10
- ✎ Excellent relevant details included in the explanations. 8.5/10
- ✎ Project background and context was good.
- ✎ Project background and context was good with relevant examples given in the discussion. 8.5/10

17/20

KNOWLEDGE AND UNDERSTANDING

- ✎ Project purpose was very clear and a good confident explanation was delivered. 4/5
- ✎ Project constraints were highlighted and weighed up against the costs. Codes of practice and standards were explained in the questioning section. 4/5
- ✎ Environmental and sustainability has ben covered and explained in the design, purpose of the project and covered in the questioning section. 4/5
- ✎ Functional design was very good and very well explained. 4/5
- ✎ Response to questions was excellent. 8./10

24/30

ANALYSIS

 Problem was clearly defined and the level of detail was very good. 4/5
Functional design specification was clear. and explained very well. 9/10
A good argument given for the choice of final solution. 4/5

17/20

PRACTICAL APPLICATION AND DEP.

 Design spec included good detail and explained very clearly with a block diagram. 4/5
Argument for critical choice of final solution was very good with plenty of details given in the explanation. 8.5/10
Project plan included a good work breakdown of criteria for the project. 3.5/5

16/20

SKILLS FOR PROFESSIONAL PRAC.

 Slides contained good relevant information resulting from research. 4/5
Overall delivery was very good with attention to detail. 4/5

8/10