

Design Communications Graphics Project

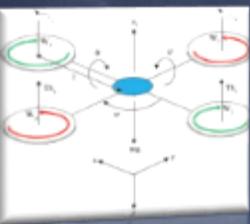
Student Assignment



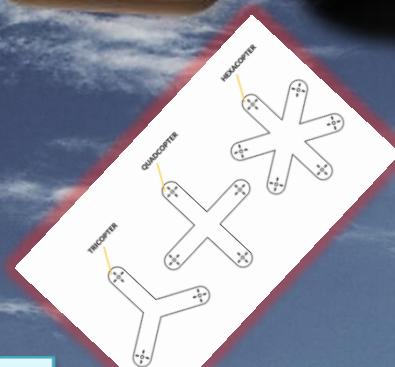
Physical form /Shape

Design Research

Every day drones or Quad copters can be easily recognised by their unique shape . A main body with four legs extending from it . At the end of each leg there are motors which power the propellers which are attached to it . Some drones can be folded up and then they become pocket sized this effects the shape of a drone as it has to be more angular and compact for it to fit.

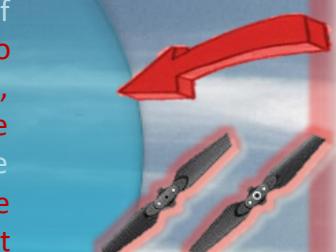


SPARK



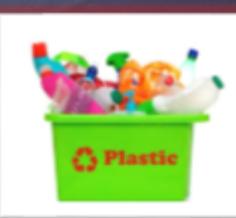
Additional Features

The amount of extra features you get with a drone depends on its price . A higher end drone would have features like gps tracking , 4k video , visual tracking of moving objects , virtual reality headset so you can view your 360 degree videos, extra batteries so you can spend more time flying your drone, and spare propellers in case they break . Mean while on a lower end drone you really don't get that many other than a 720 p camera and a feature called altitude hold which means you can configure what altitude your drone will be flying at.



Materials

Most drones today are made out of 2 materials; carbon fibre or plastic. Plastic is used in mass production as it is cheaper than carbon fibre and light weight therefore it helps with the aero dynamics of the drone. Carbon fibre drones are very light weight and at the same time extremely durable making it the perfect material for heavy duty drones to be made out of.



Uses

Drones in the 21st century have become quite popular. You can pick a drone up just about anywhere nowadays. They are most commonly used for recreational purposes such as taking bird view photos or videos. For some people its just a hobby going to fly their drone around their neighbourhood. The originally intended use for drones was for the military to use although those drones are considerably more expensive

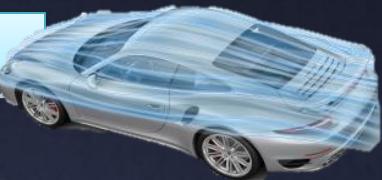
Safety Features

As drones get more technologically advanced they need more and more safety features in case of an accident. One main safety feature that most drones have nowadays is called "back home" which means that the drone will automatically go back to its starting position. Another feature is called "emergency landing" this means if an emergency landing is necessary it will land to a known and safe location . Some drones are also equipped with a feature named " geofencing" which keeps the drone from exiting a special operational airspace .



Design Research

Aerodynamics

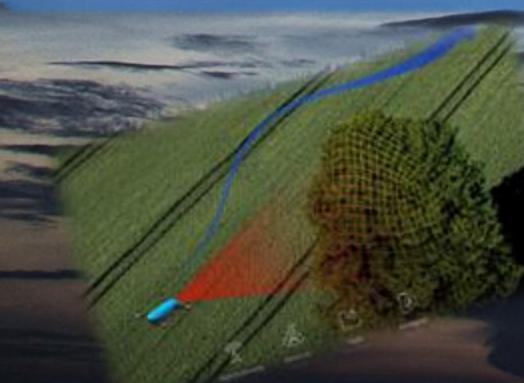
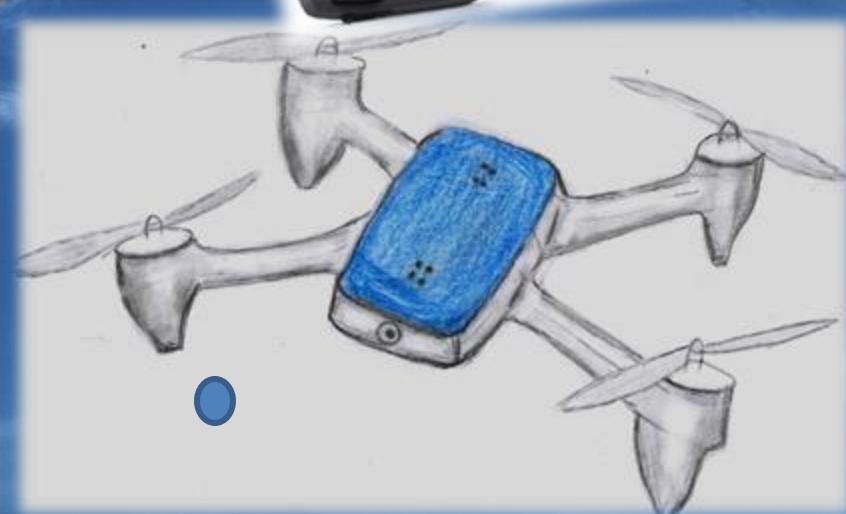
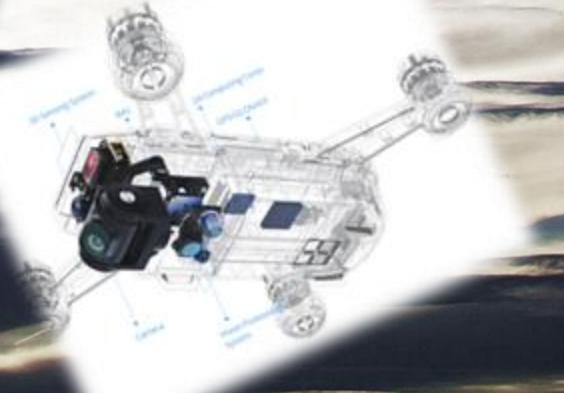


The aerodynamics of a drone depend on the size and shape of the wings/ propellers, the shape of its main body and the materials it's made out of. A smoother body with fewer edges and more curves will help to reduce the drone's drag as it flies through the air at high speeds. The size and shape of the propellers play a huge part in the aero dynamics of the drone. You would like the propellers to be directly proportional to the size of the body in order to create enough air flow and thrust for take-off and during flight. The propellers on drones are slightly curved to create lift at take-off. Most drones are made out of light durable materials (eg: plastic, carbon fibre). This also helps with its aero dynamics as it reduces the weight of the drone and adds stability and sturdiness at high speeds.



Power Source

Common day drones tend to be all powered by electricity. More so by lithium polymer and lithium ion batteries . The power of these batteries vary by drone. The size of a drone's battery is usually determined by what it has to power . For example if it has to power a camera, lights etc . It also may depend on its performance . A drone that is meant to fly greater heights needs bigger and better motors therefore it would need a bigger battery . A drone that cost around 50 euros has a 700ma battery that can fly for 15-20 minutes before needing it to be recharged for 45 minutes .



Physical form/shape

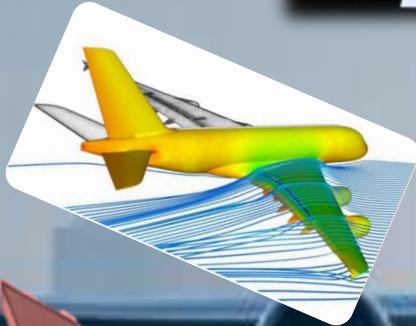
DJI spark

The DJI Spark quad copter has a very aggressive look with many edges. It has a main body shaped like a rectangle. From the main body four legs extrude these legs give stability to the Spark when landing and they also house an electric motor and a propeller each.



Aerodynamics

Despite having a body with minimal curves I imagine that the DJI Spark is aerodynamically sound. This is because it narrow shape and small size. This means while flying it has less surface area and therefore creates less drag. The DJI also has one rectangle shaped holes on each leg. This helps the drone at take off by reducing surface area on the leg and letting air flow freely through it.



Compare and Contrast

Materials

The DJI uses a durable plastic for its main body and legs. The 4 individual motors are all housed in a metal casing inside the legs. The full hd camera is protected by glass so are the sensors at the front. The propellers are made of glass fibre reinforced composite



Holy Stone HS 100

Physical form/shape



The Holy Stone hs-100 in my opinion is shaped like helicopter propellers. It has no visible edges on its body unlike the DJI Spark. The body consists of 2 main pieces they are both identical in shape as they are joint at the centre and have to be perfectly symmetrical. This design allows the hs-100 to be more aerodynamic than the DJI Spark.

Aerodynamics

Although having a very smooth body which certainly helps the hs-100 with its aerodynamic capabilities there are some setbacks to having a design like that. The main one in my opinion is that because the body is designed as two pieces unlike the Spark its legs are not separate. It might not seem that important but where as on the DJI the leg meets the body at almost a 90 degree angle the hs-100 has opted a smooth design. This adds much more surface area to the drone making it less aerodynamic in some places.

HS-series



Materials

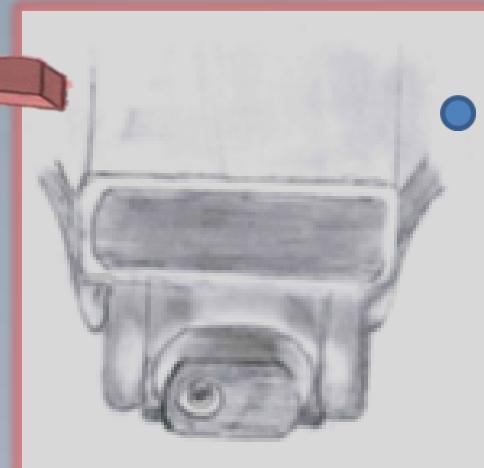
The body of the hs-100 is made out of plastic just like the Sparks . It has 2 separate legs which are also plastic. The camera just like the Sparks is protected by a plastic housing and the lens by glass. The propellers are made of a plastic compound. The Spark and the hs-100 are very similar in build quality as they are both considered mid range drones.



Safety Feature

DJI spark

The Spark offers many impressive safety features like: worry free flight, fly smarter and enhanced awareness. Worry free flight makes sure that in case of you lose connection or the battery is low on power it will automatically fly back to its starting point. Fly smart lets you know if you are in an area where flying your drone is a safety concern for example airports or near stadiums. Enhanced awareness is a safety feature that can detect obstacles from up to 16 ft away and if the drone's path does collide with the obstacle it can accurately hover over or around it.



Power source

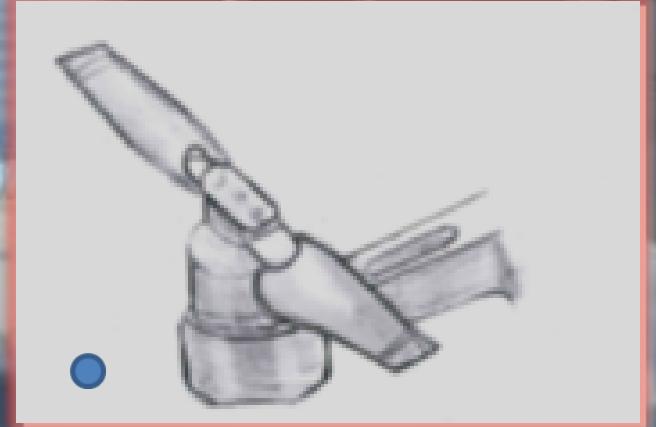
The Spark's main power source is its battery. It has a Lithium Polymer battery. This battery has a mAh rating of 4480. It has a range of 16 minutes before it needs to be charged. When using a standard USB cable, the battery needs 80 minutes to fully charge. When using a charging hub, it takes 55 minutes to get a full charge.



Compare and Contrast 2

Uses

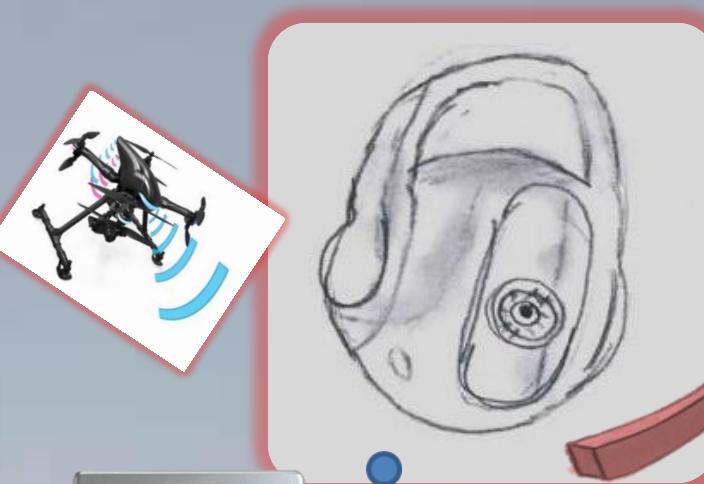
The DJI Spark being a lower to mid-range drone is mainly used for cinematography. It is more of a hobby drone used for capturing great views and pictures, giving a new perspective to landscape.



SPARK



Holy Stone HS100



Safety Feature

The HS-100 has 3 main safety features: altitude hold, return to home and follow me mode. Altitude hold lets you select an altitude you like for your drone to hover at constantly. This feature is great for indoor flying as it restricts the altitude therefore you cannot hit the ceiling. Return to home is much similar to the worry-free flight feature on the Spark. This feature will automatically land the drone in case the signal is lost or the battery is going to run out of power. Follow me mode is designed for taking great pictures or videos while doing some other activities eg: running or cycling where your hands are occupied. Once you set your drone to this mode it will automatically follow the remote controller.

Power Source



Just like the Spark, the HS-100 uses a Lithium Polymer battery. This battery has a mAh rating of 2500 and voltage of 7.4V. It has a flight time of 10-12 minutes before it needs to be recharged. Charging takes around 3-6 hours using a micro-USB to USB cable. Compared to the DJI Spark, the charging time takes considerably longer even though it has a smaller battery.

Uses

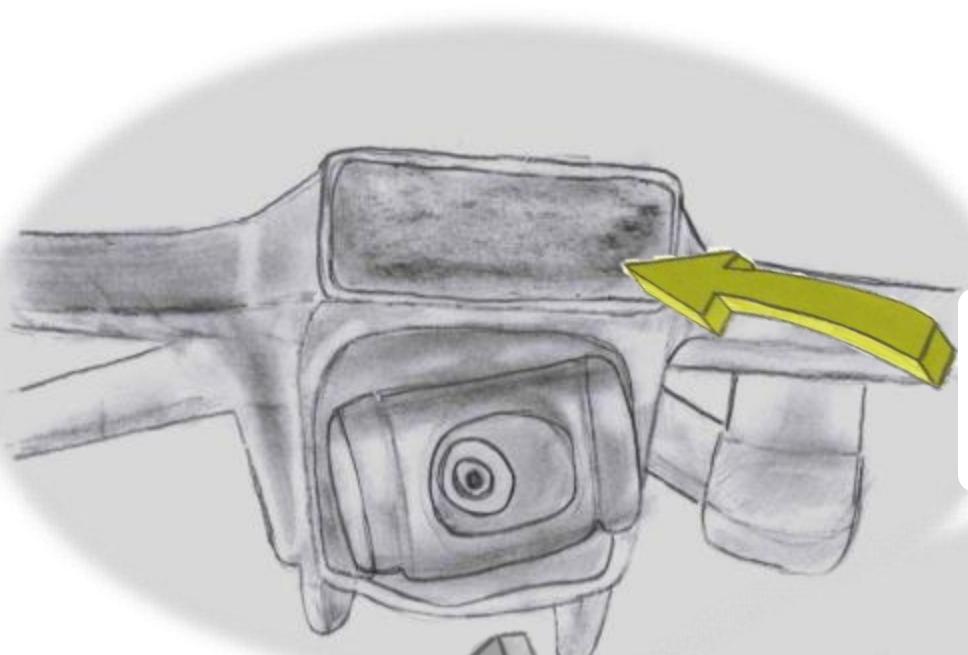
HS-100 which is also a lower to mid-range drone in perspective to its price, is used for taking pictures and videos. Both of these drones lack equipment to make them professionally useful in situations like: oil, gas and mineral exploration or disaster relief.



DISASTER RELIEF

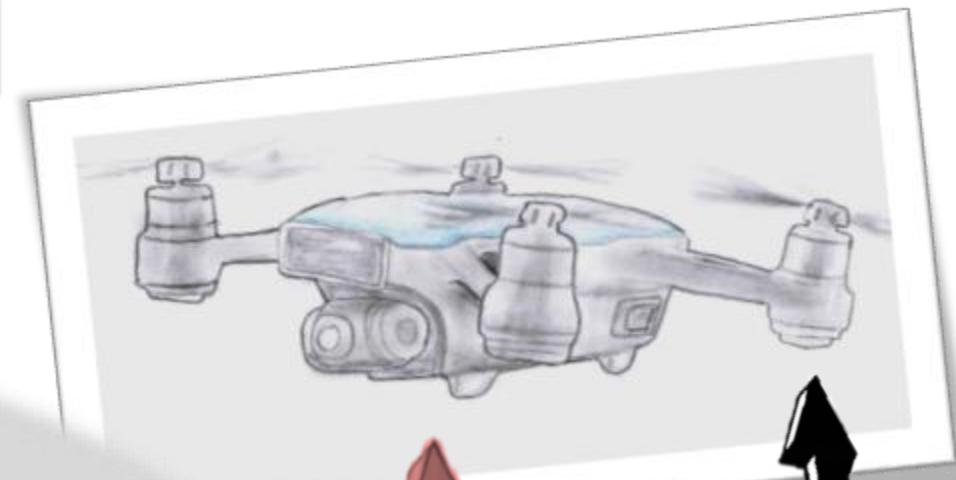
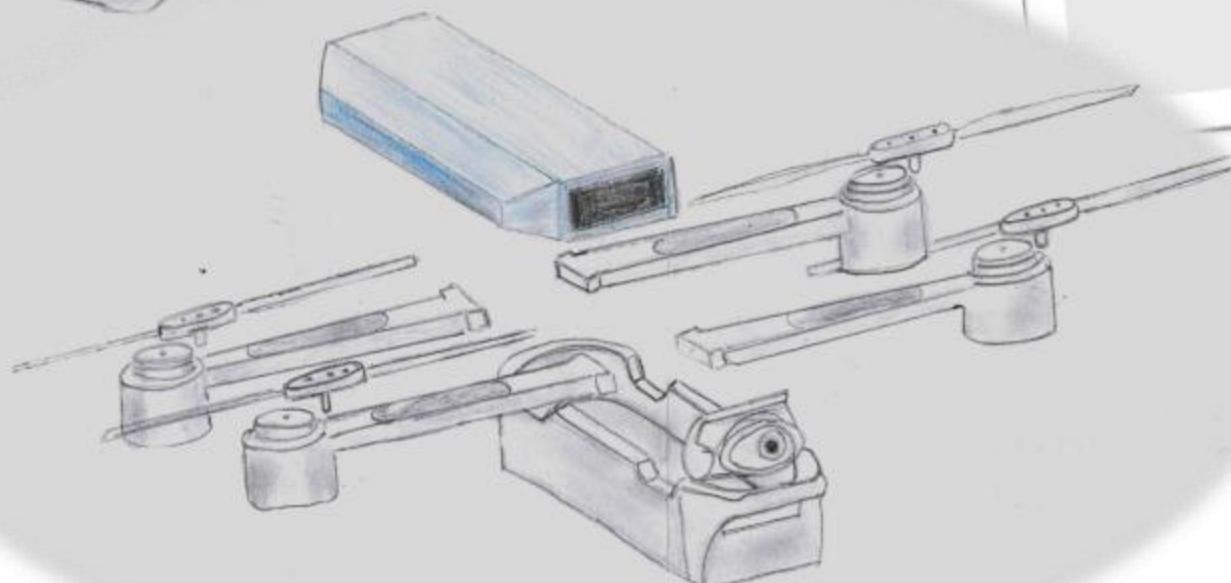


Freehand Graphical Representation



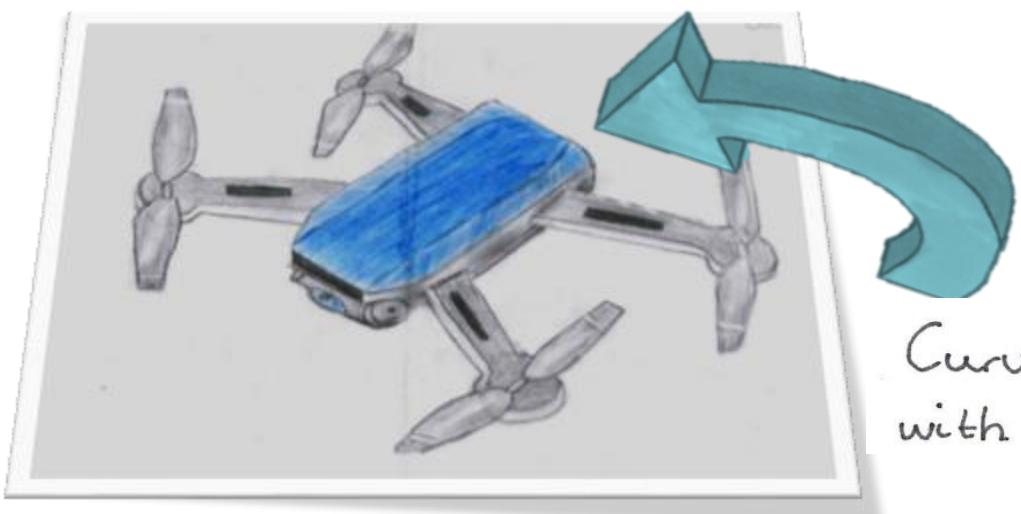
Proximity Sensors

4K rotatable camera



Electric Motors

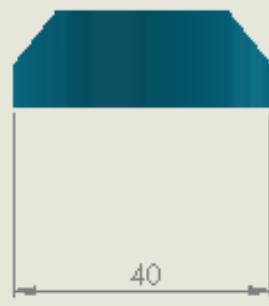
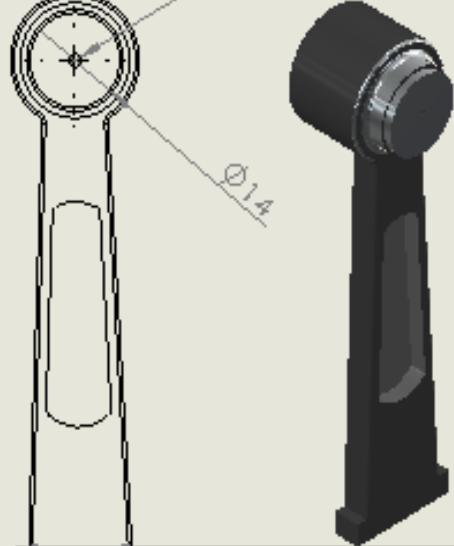
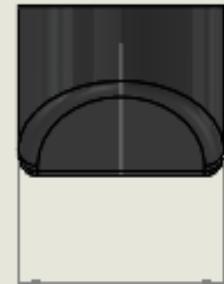
Legs help aid landing
and improves stability



Curved top helps
with aerodynamics

Curved propellers create thrust
this makes Flying possible.





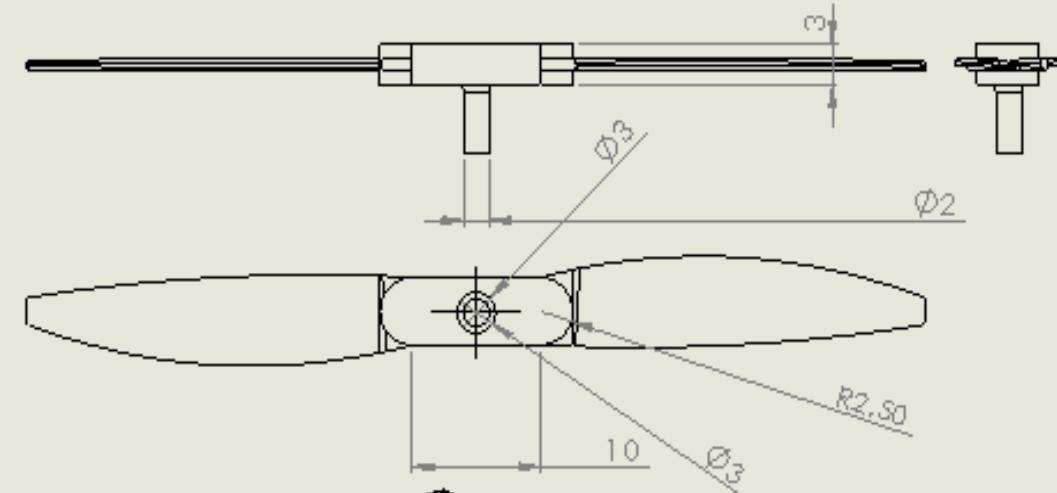
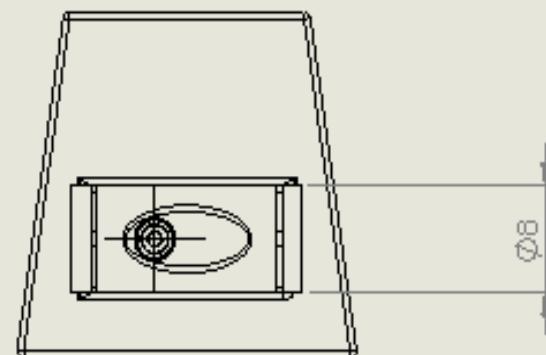
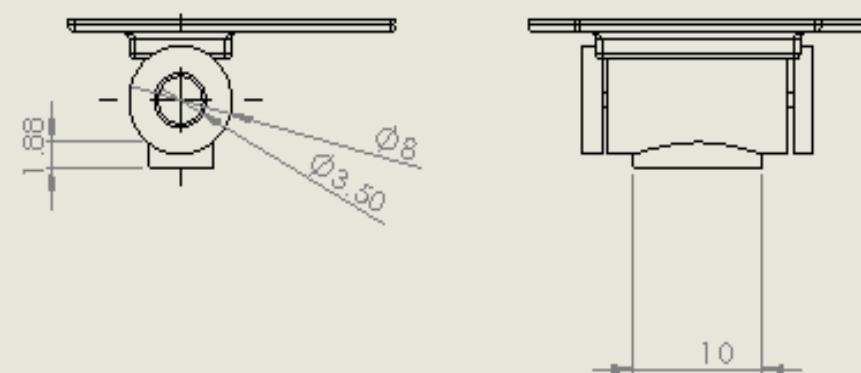
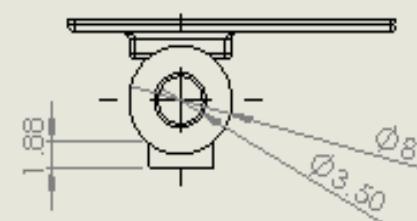
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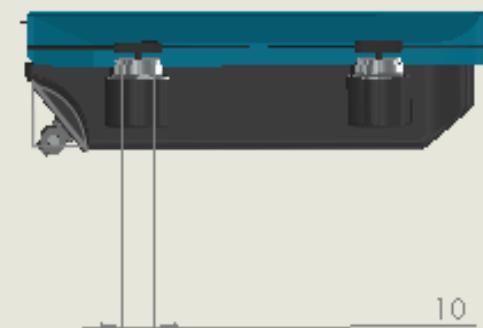
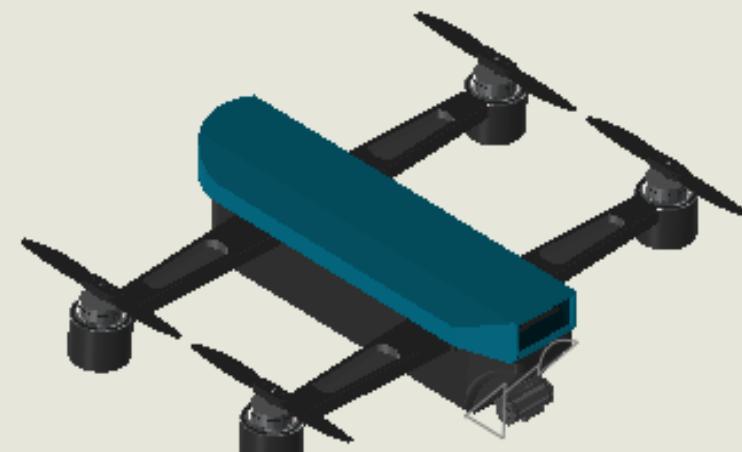
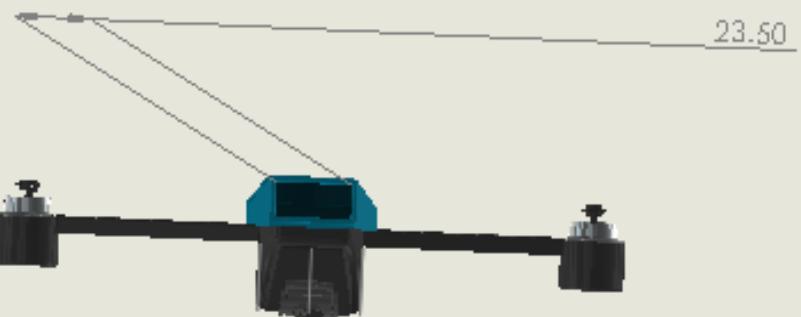
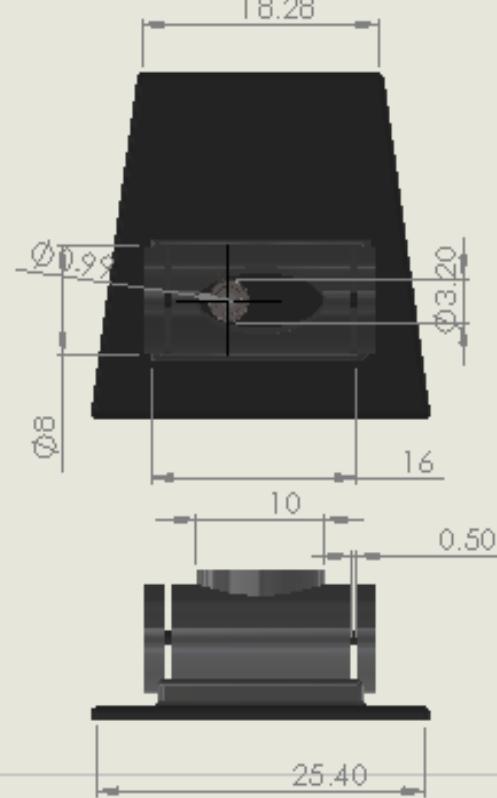
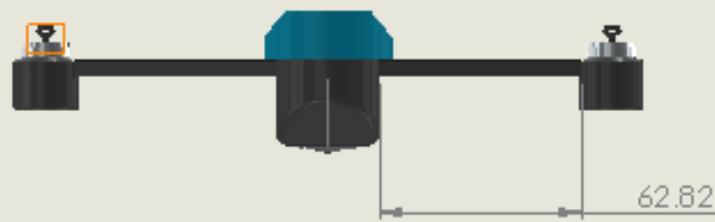
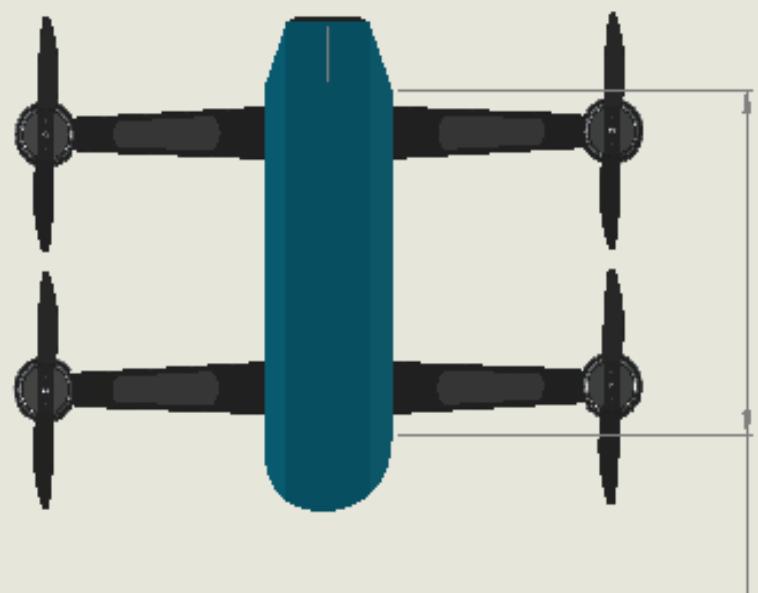


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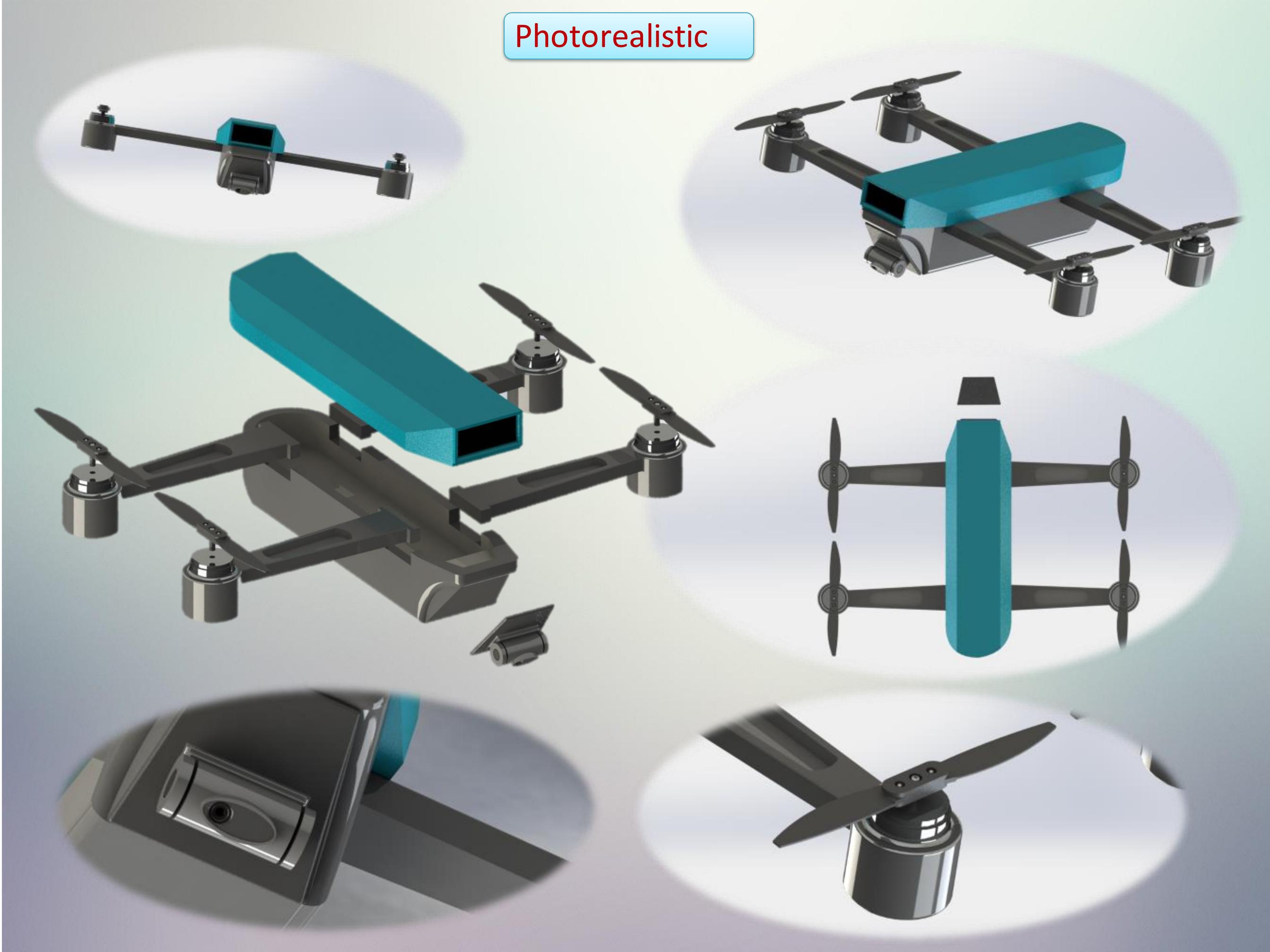


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Drawing Name:

Photorealistic



Aerodynamics

To help with aero dynamics I have decided to get rid of the wheels. This makes the drone lighter and it also creates less drag when flying. The shape of a skateboard is a rounded off rectangle this makes it aerodynamically efficient as a drone.



Graphic Exploration

Skateboard inspired Drone

I have always liked the sport of skateboarding so I decided to focus on making a drone that resembled a skateboard



This drone can be used for recreational purposes. It can also be used for cinematography or just as a hobby.

Materials

This drone will be made of plastic as it is light and durable. The propellers will be made of carbon fibre. Wood will not be used as it is much heavier than plastics and harder to work with

MATERIALS

Safety Features

This drone will be equipped with many safety features. Most important of all is the camera and proximity sensor. They will work together to detect any objects that may come into the drones path.



Power Source



The main power source of my drone are going to be lithium polymer batteries they will be stored on the underside of the drone.

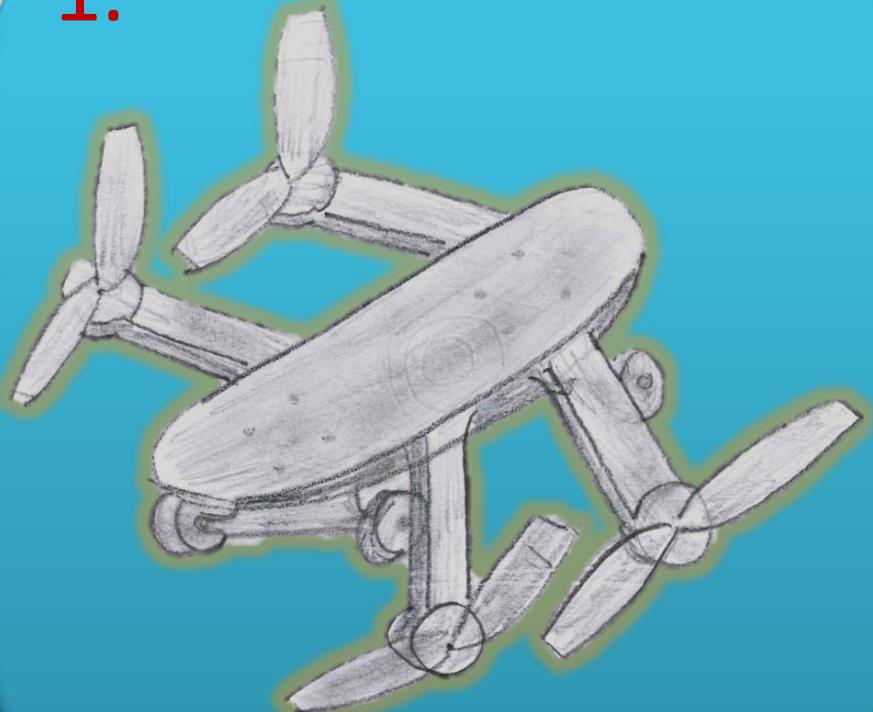


Uses

Physical Form/Shape

The physical form of this drone is based upon a skateboard. It had been made thicker for components to fit inside. It has also lost its wheels. This is because they no longer will be needed as it just makes the drone heavier.

1.



Design 1.

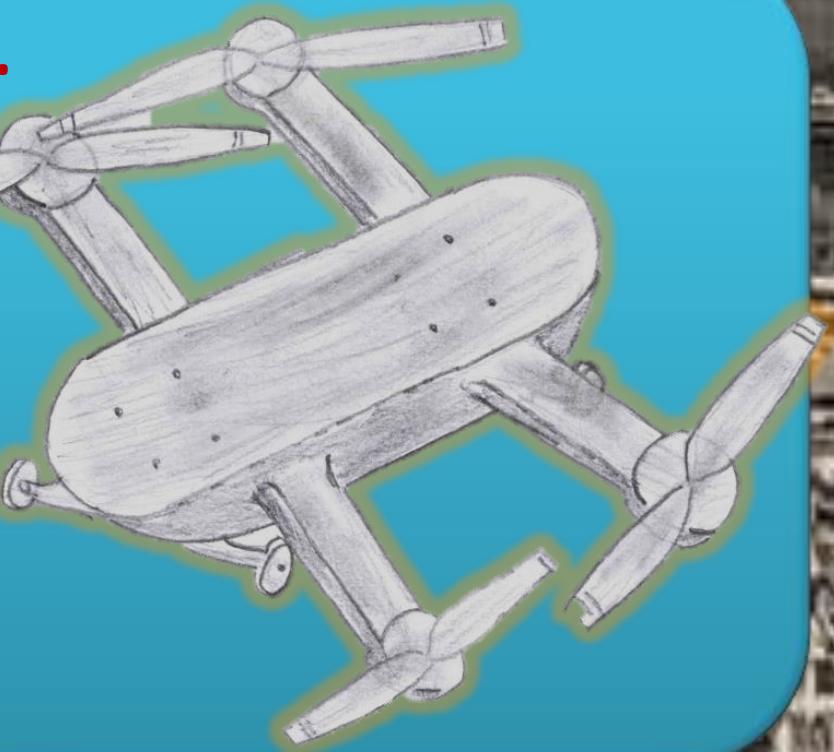
This design is entirely based of a skateboard. The skateboard had received legs and motors complete with propellers. This design would not have been functional as the body of the drone would be too slim and therefore could not house any internal components.

Graphic Exploration

3.



2.



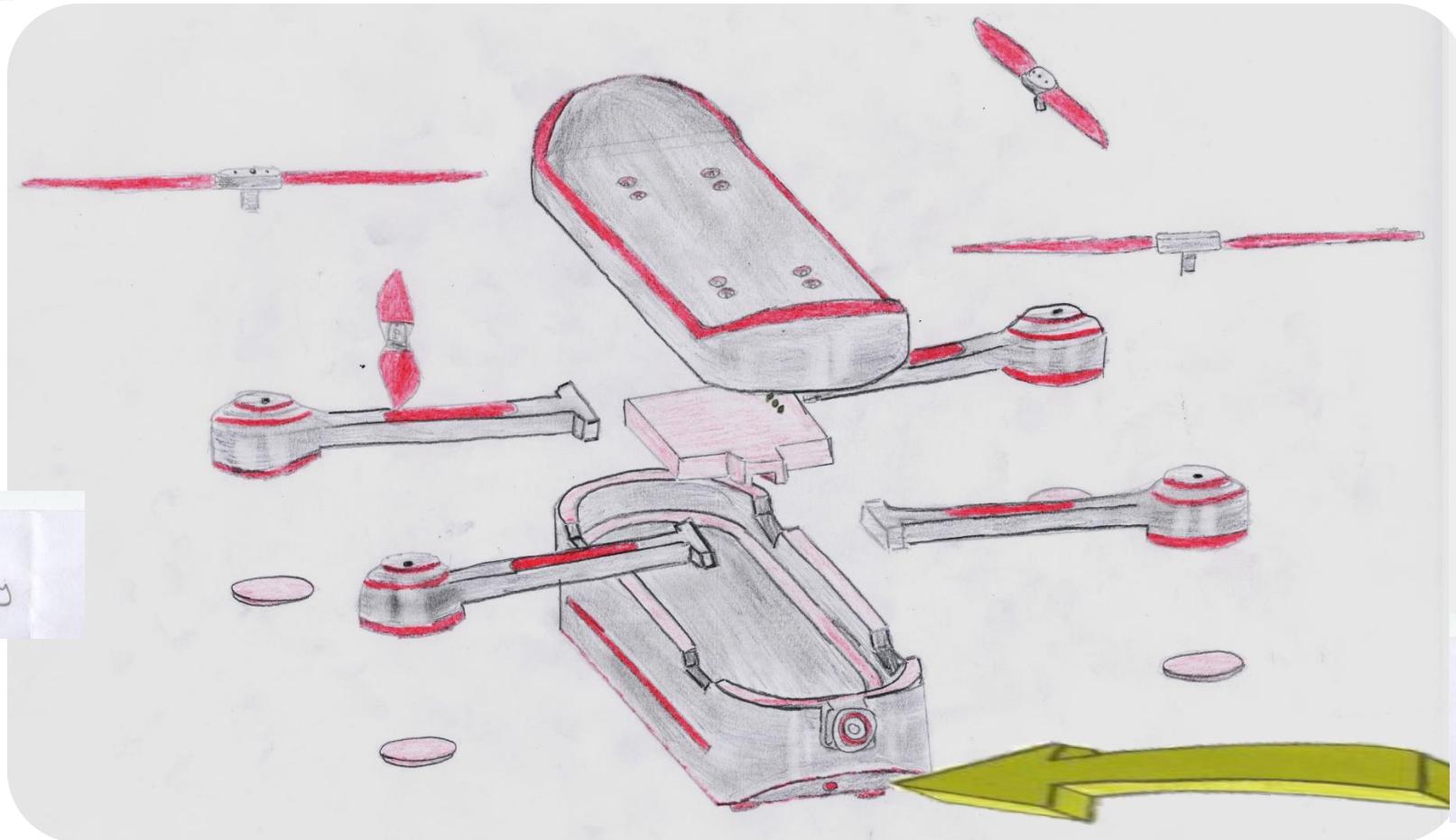
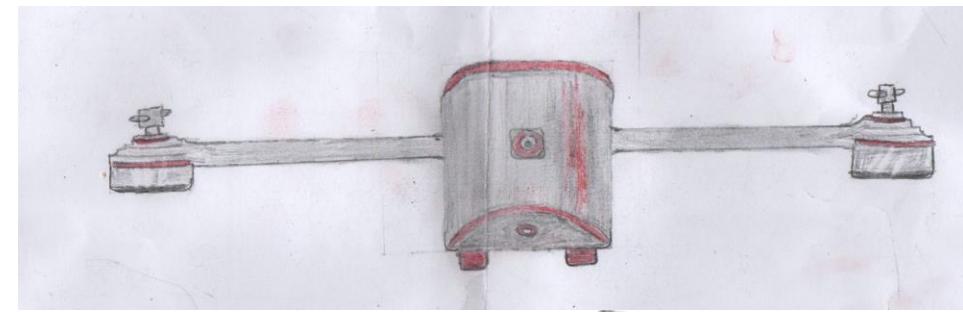
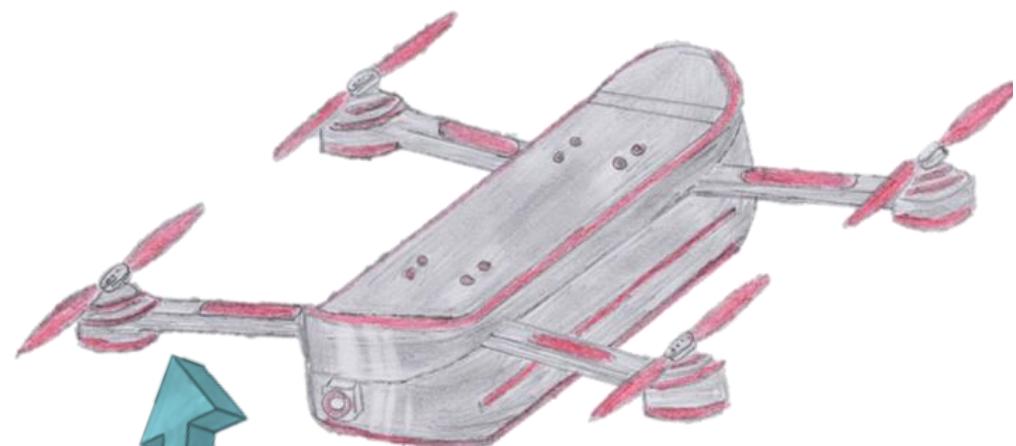
Design 2.

This design has improved further as now the drone is thicker in order to become functional as a drone. The top of the drone was further improved as now it got flatter not like we have seen in previous designs. This helps with aerodynamics.

Design 3.

This is my final design. The drone has lost its wheels. This makes its lighter and more stable while flying through the air, as it reduces drag created by the wheels. In this design I also added a camera to the front of the drone and a proximity sensor to the bottom to make it safer.

Freehand Graphical Representation

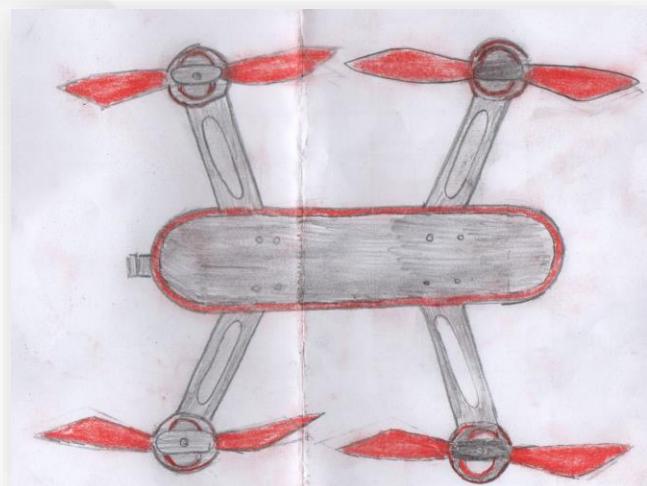
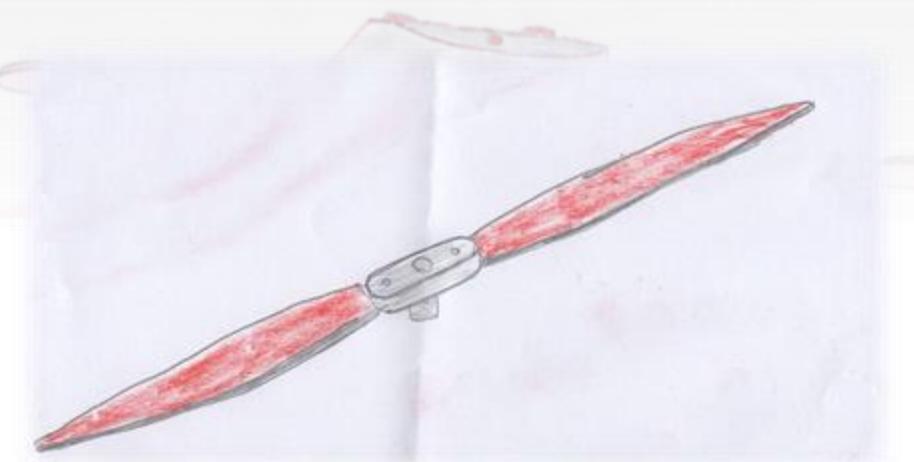


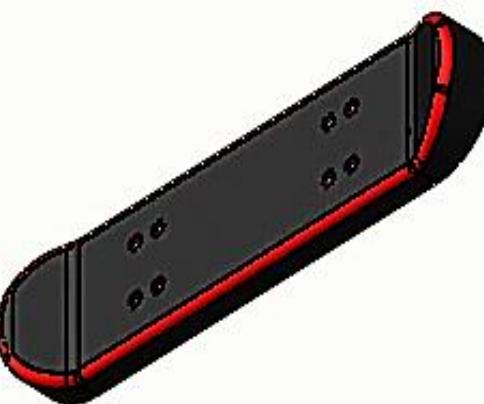
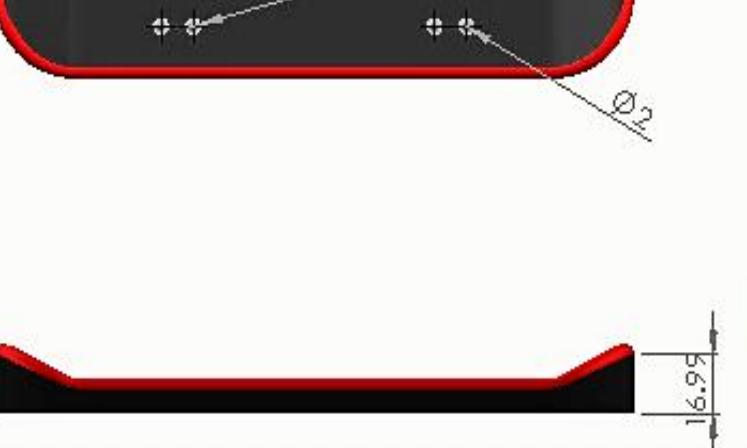
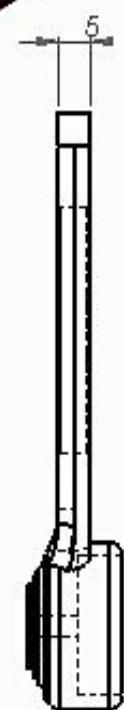
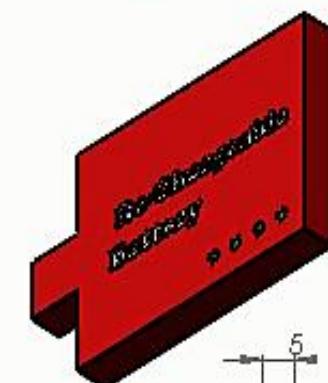
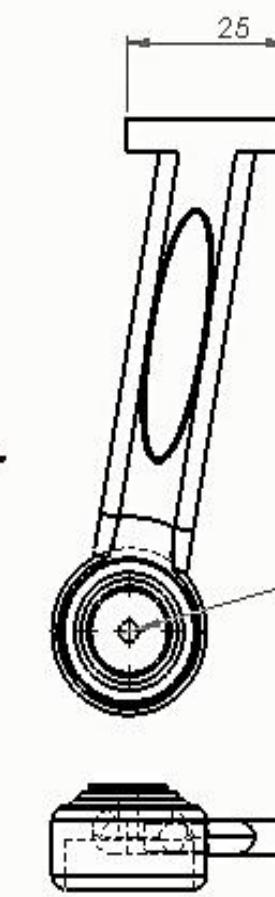
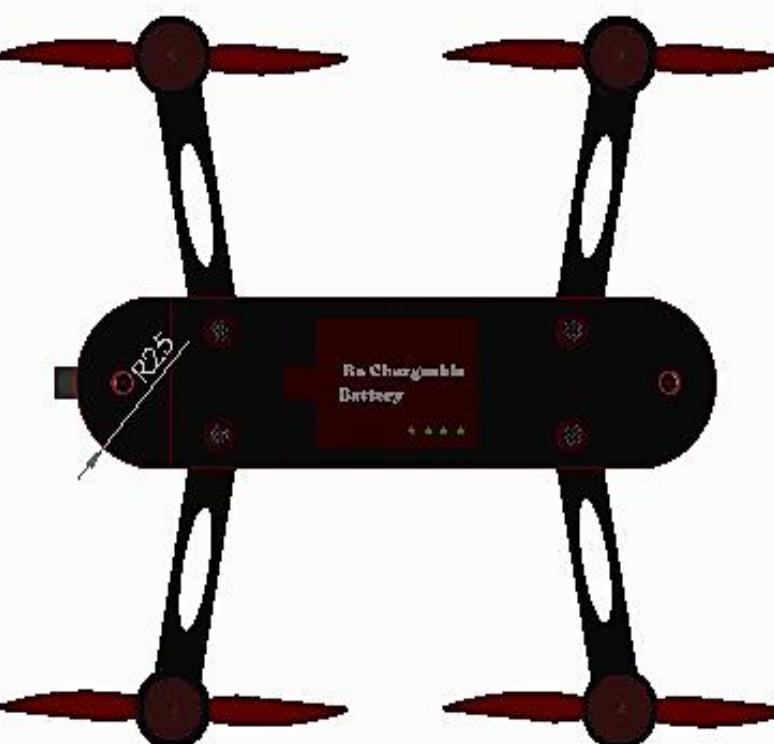
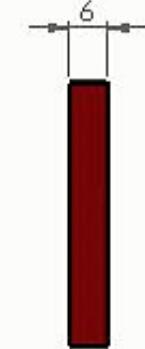
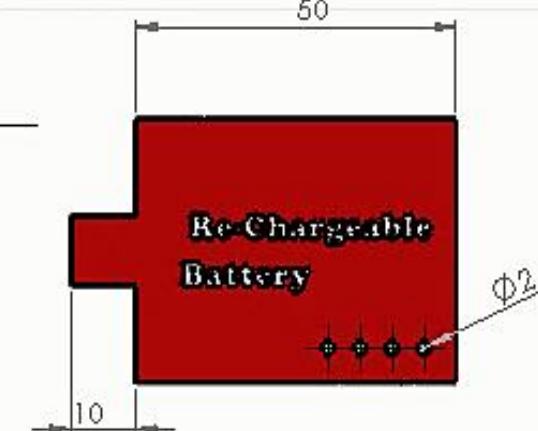
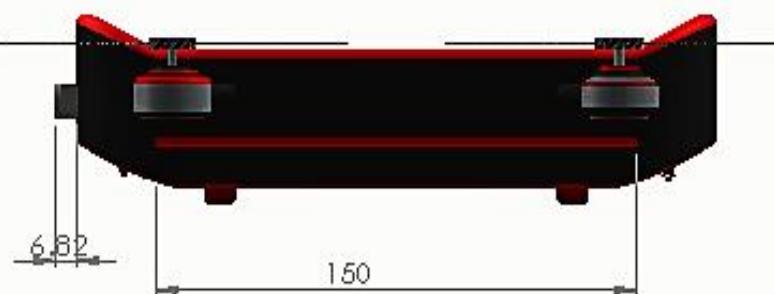
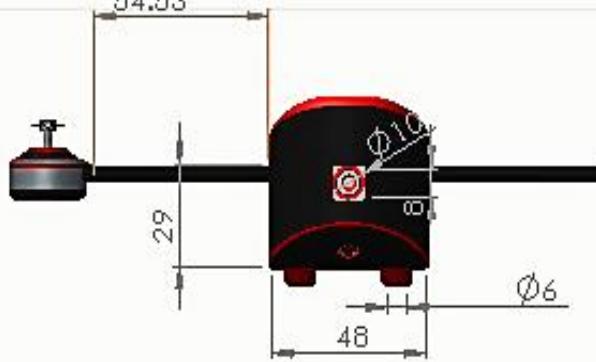
Electrically
Powered Motors.

Legs help aid landing
and improves stability.

Re-charchable battery

Proximity
Sensors

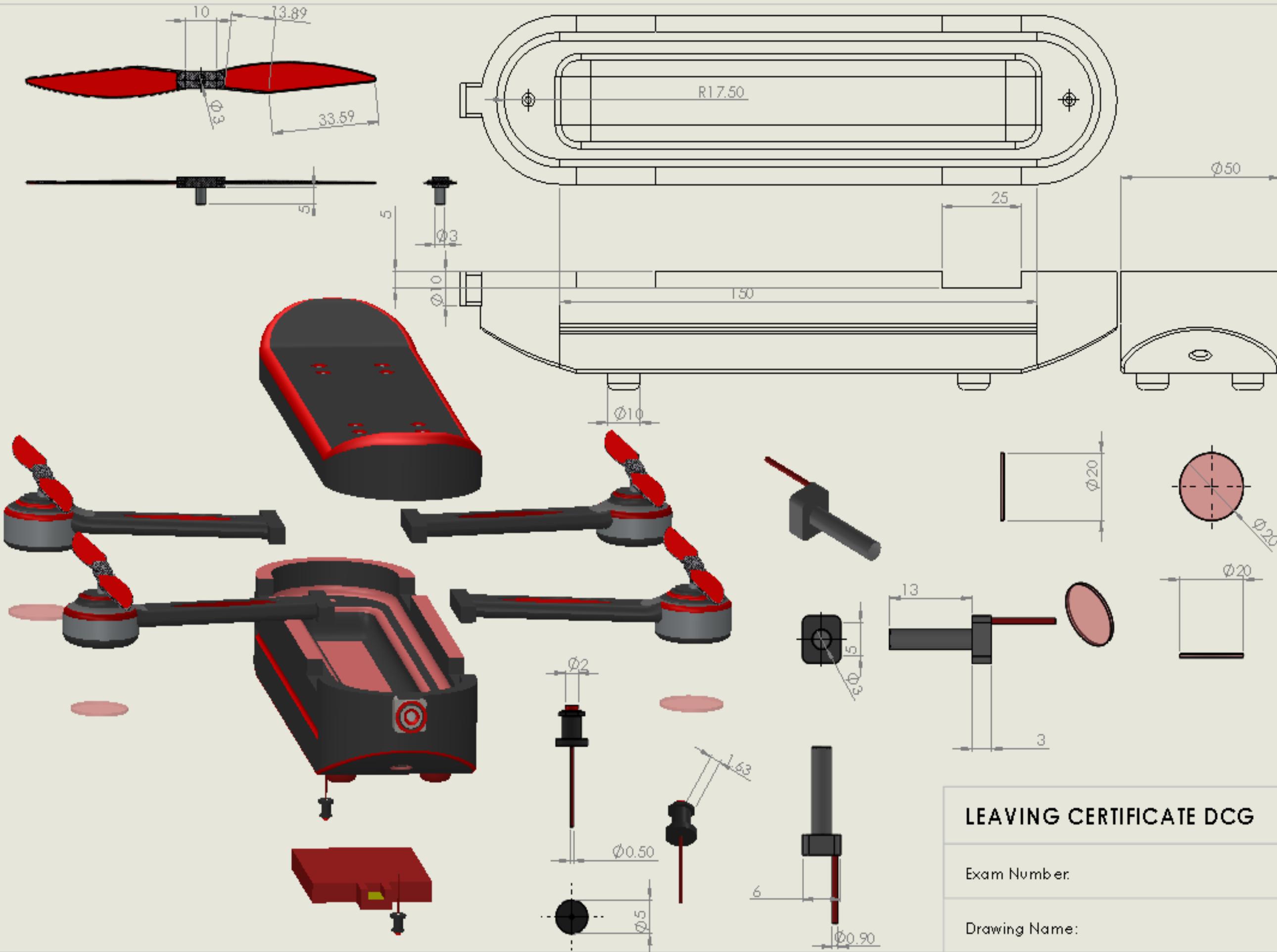




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