1.1 Mechanical Design

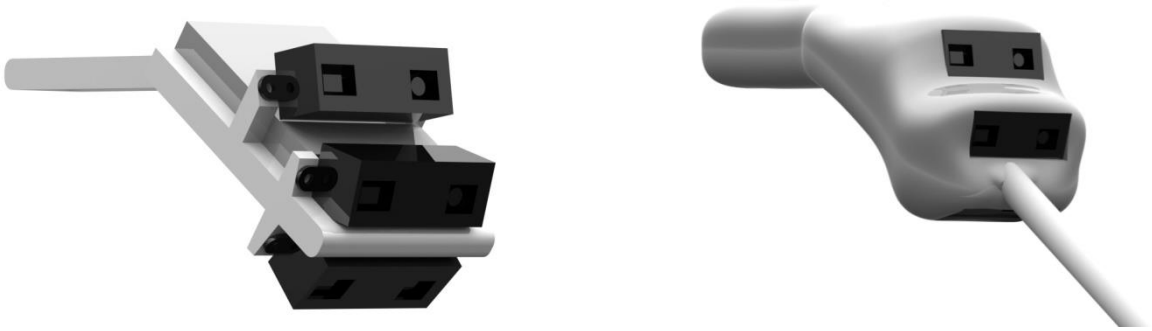


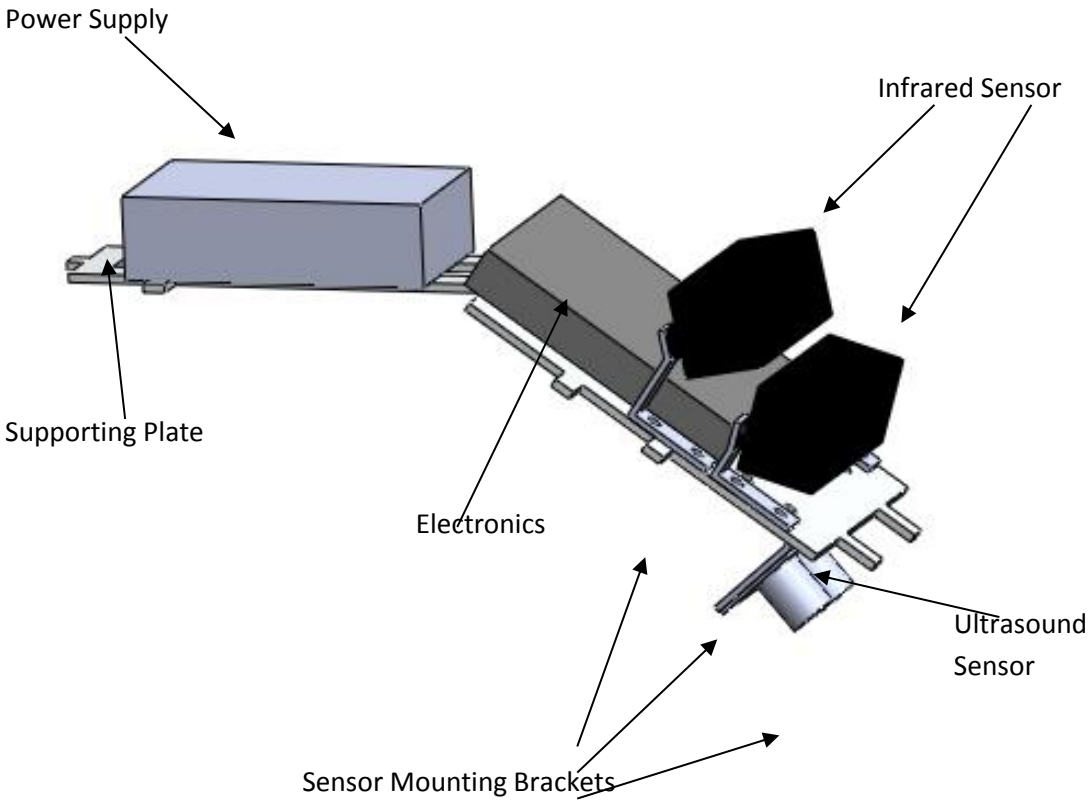
Figure 1 - Concept for mechanical design of the product

The Initial concept renders for this design are shown above in figure 1.

1.1.1 1st Prototype

The 1st prototype was really a proof of concept in terms of the mechanical design. It was assumed that 2 infrared sensors above the stick and 1 ultrasound sensor underneath would be used.

1.1.1.1 Inner Support



As can be seen above it was decided the best method of manufacturing the inner mount was to make it from a sheet of aluminium as this could be easily CNC'd and bent to shape. The mounting brackets were designed with similar considerations.

The use of aluminium minimised the weight of the inner support while also providing adequate strength to support the components securely.

1.1.1.2 Outer Casing

The need for the outer plastic casing was two-fold.

1. To allow the handle to be gripped adequately and comfortably
2. To provide additional protection to the electronic components from dropping etc.

The concept for the casing was for it to be thin walled, light and able to be easily clipped around the inner support. This produces a casing which can be produced in its two halves by ABS rapid prototyping.

The relevant holes for the sensors, keypad and stick were then made:

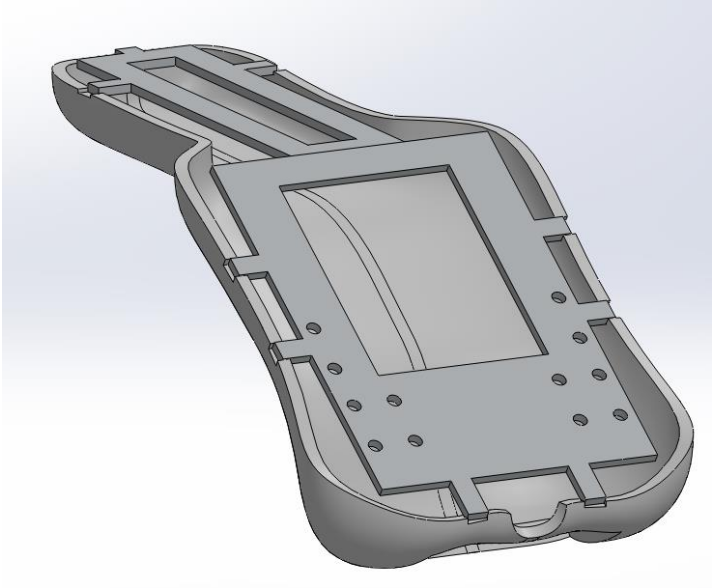


Figure 3 - Metal plate fitting into plastic casing

Figure 4 - First prototype manufactured and assembled

1.1.2 Final Prototype

The first prototype was a successful proof of concept but the final prototype had some important modifications:

- Attachment of the stick was considered
- A more secure storage place for the battery
- New sensor mounts due to a modification of sensors used
- Modification of snap grooves/hooks to prevent snapping and allow better access
- Cutaways in the plate to ensure that the connectors for the sensors are accessible.

Figure 5 - Rendered final design

1.1.2.1 Stick Support

The stick is supported by the addition to the front on the casing. It is supported axially by a cut out in the plastic into which the stick's top will slot in:

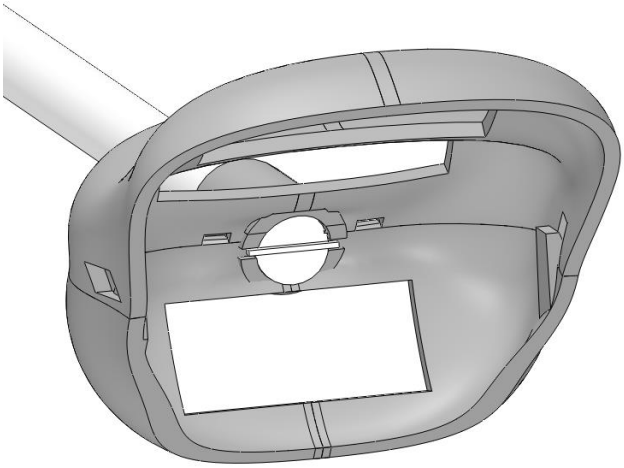


Figure 6 - Stick support in casing

1.1.2.2 Battery Storage

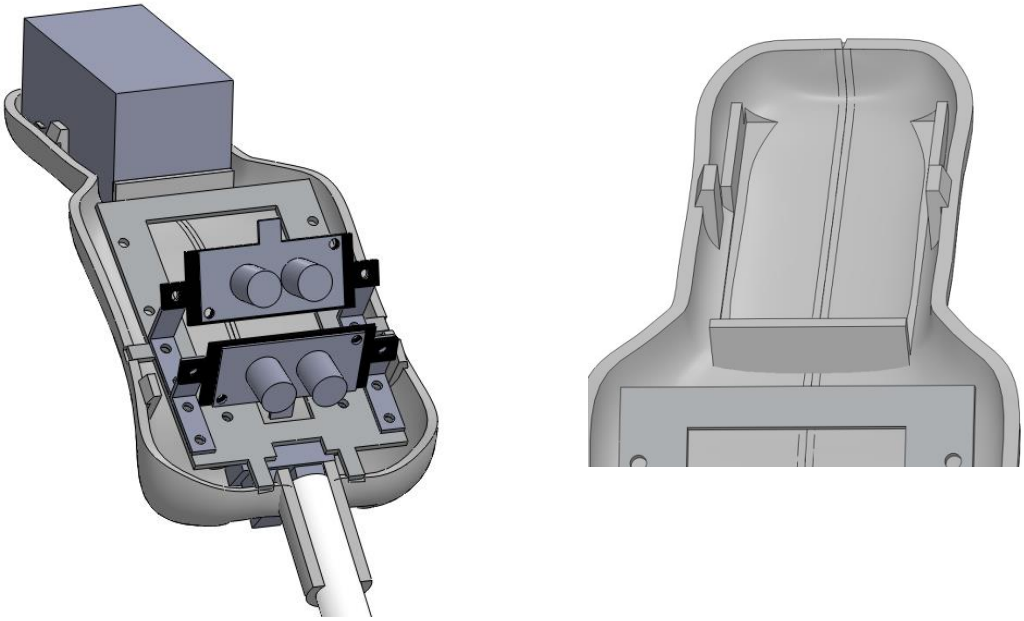
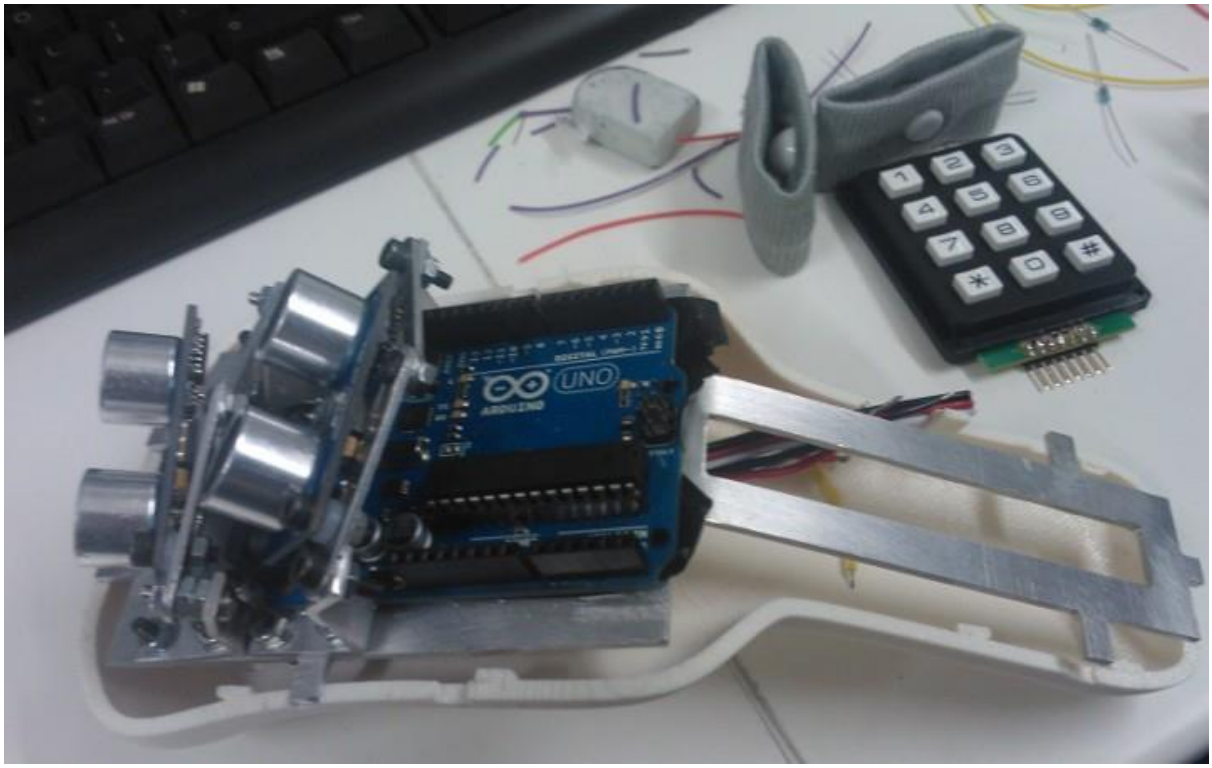
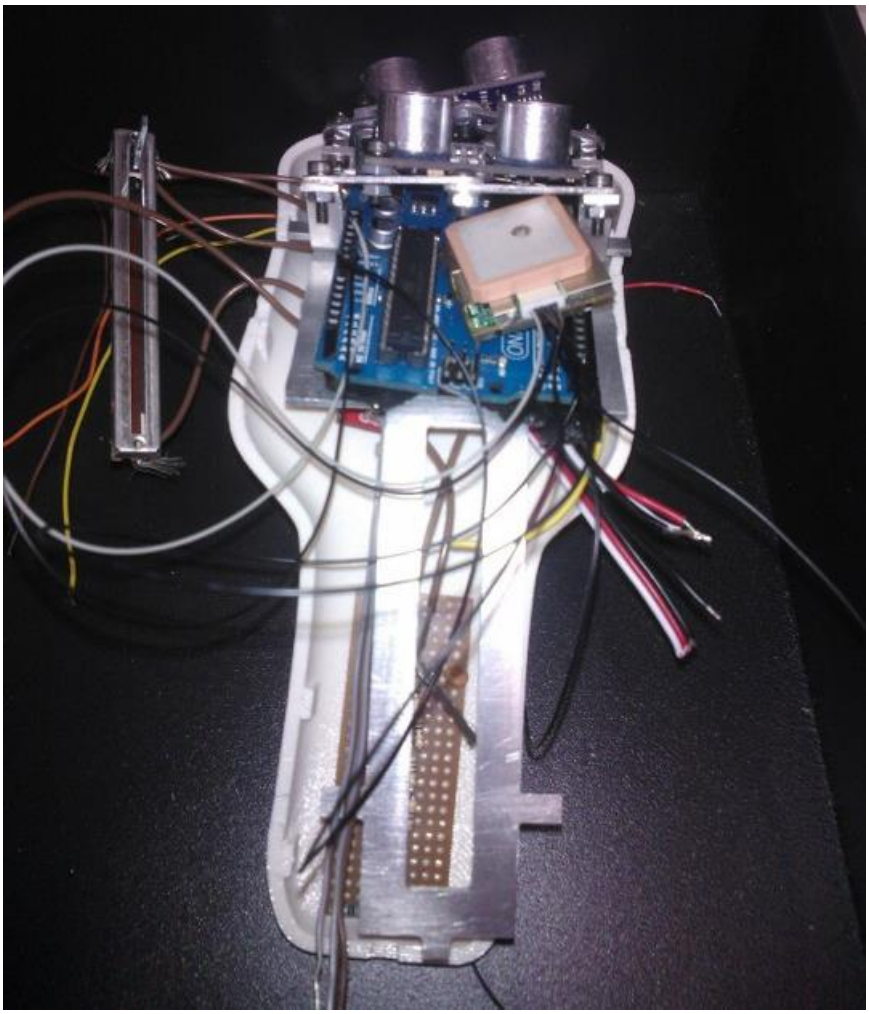


Figure 7 - Battery storage in handle

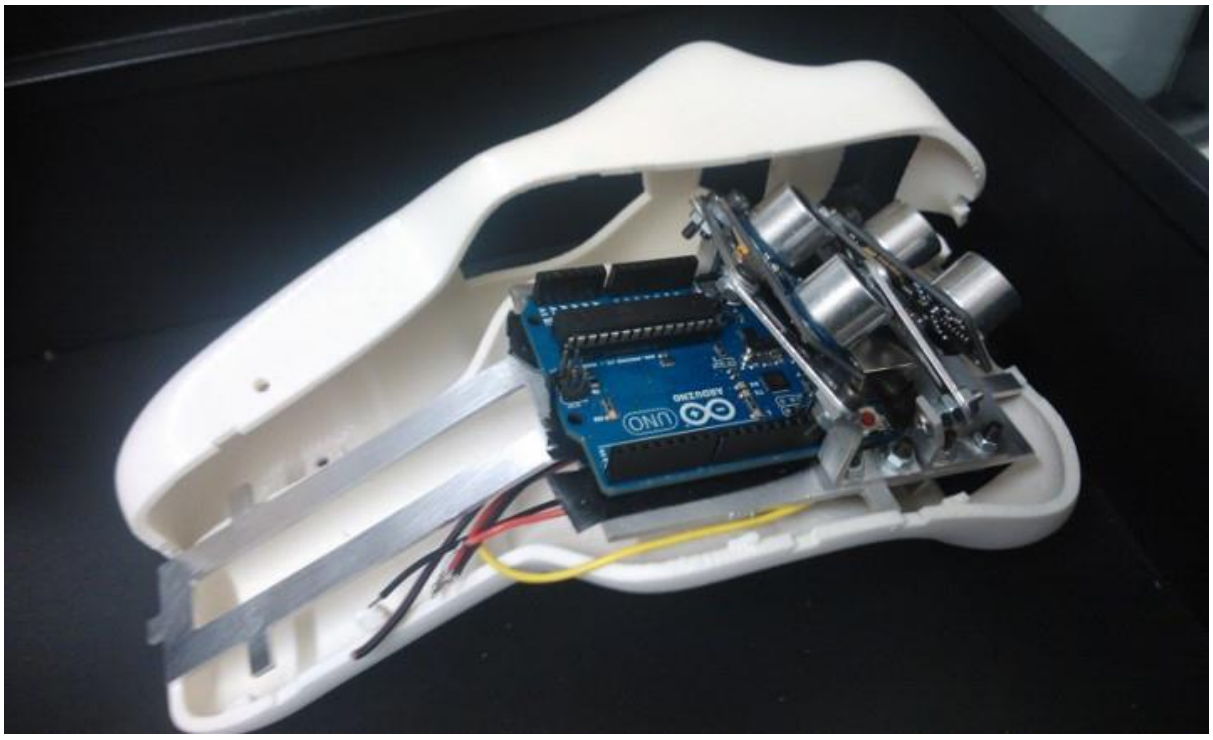
1.2 Images of First Prototype



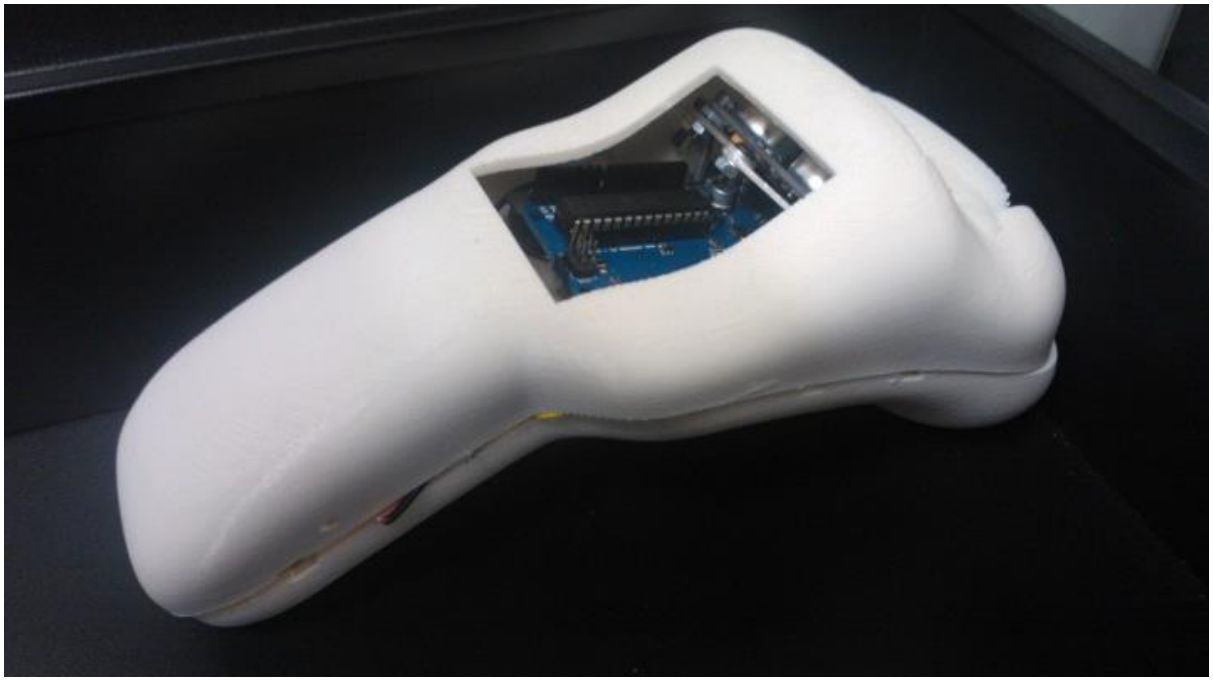
Mounting of Sensors onto the aluminium frame. Keypad and wristbands in background.



Fitting of the Electrical Components and Sensors.



Two Halves Of The Design Marrying Up.



1st Prototype Fitted Together.

Before the 2nd prototype can be fitted together we are still waiting on :

- Workshop to produce custom PCB.
- GPS module, Compass and associated wiring to arrive.
- Workshop to produce Aluminium bracket.

Therefore all we have to show so far of the 2nd prototype is the 3D printed outer casing below.

Rapid Prototype Outer Casing for Second Prototype